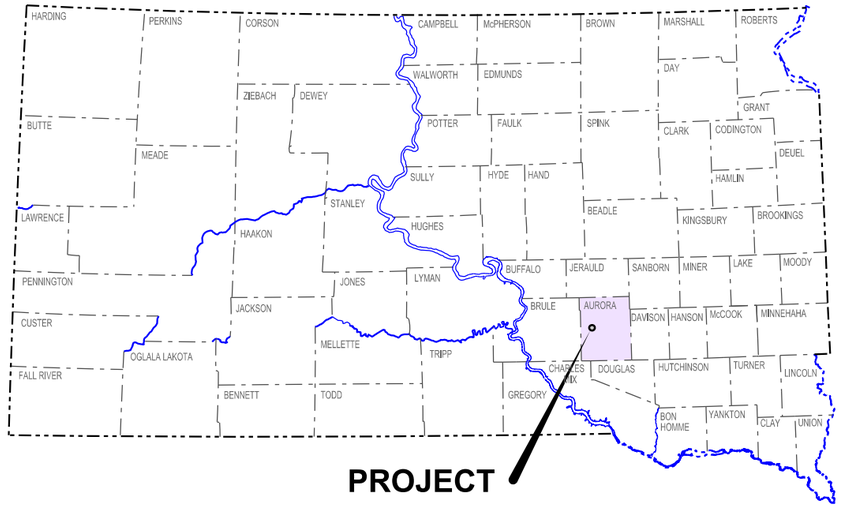


STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 090W–288
INTERSTATE 90 WBL
AURORA COUNTY

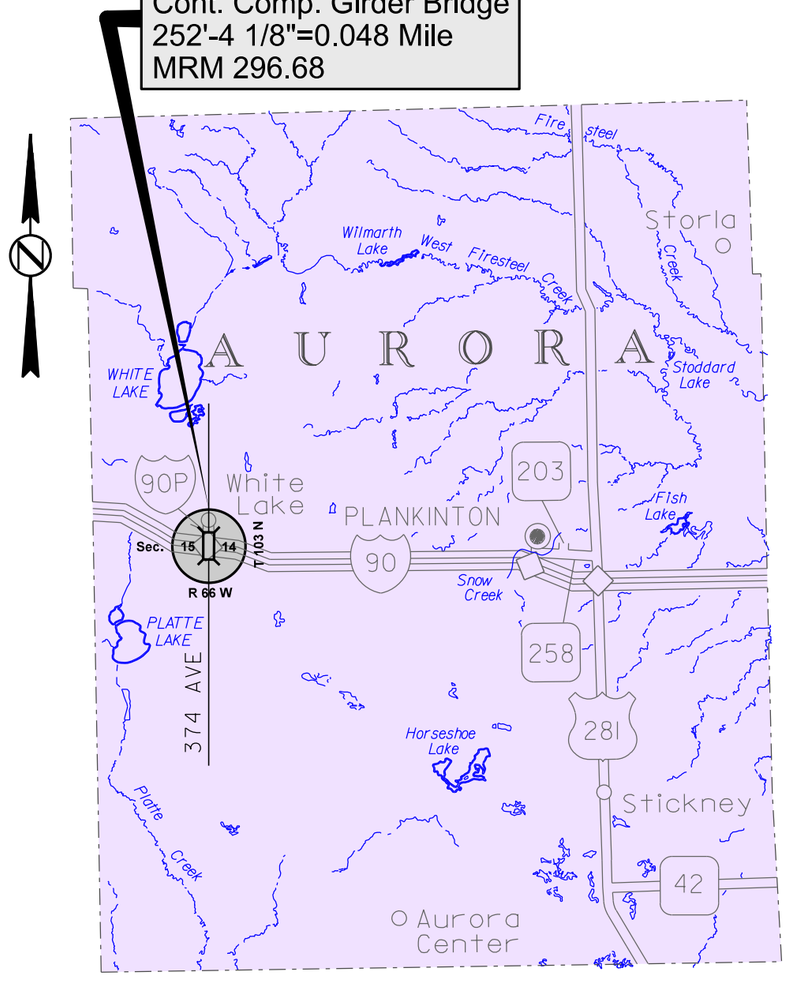
STRUCTURE REPAIR - HEAT STRAIGHTENING
PCN I4K8

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-288	1	26

Plotting Date: 10/31/2018

INDEX OF SHEETS

STRUCTURE 02-040-149
Cont. Comp. Girder Bridge
252'-4 1/8"=0.048 Mile
MRM 296.68



STORM WATER PERMIT
(None required)

I90W ADT (2017) 4,052
I90E ADT (2017) 4,052
I90P ADT (2017) 231

ESTIMATE OF QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-288	2	26

090W-288

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
634E0010	Flagging	40.0	Hour
634E0110	Traffic Control Signs	381.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	2	Each
634E0420	Type C Advance Warning Arrow Board	1	Each
634E0600	4" Temporary Pavement Marking Tape Type I	144	Ft
634E0640	Temporary Pavement Marking	4,160	Ft

STRUCTURE NUMBER 02-040-149

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
~~250E0030~~	~~Incidental Work, Structure~~	~~Lump Sum~~	~~LS~~
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E0250	Heat Straighten Steel Member(s)	Lump Sum	LS
410E0520	Surface Grinding of Structural Steel	84	SqIn
410E3010	Magnetic Particle Weld Inspection	236	In
410E3030	Magnetic Particle Weld Inspection, Impact Damage Repair	2,651	SqIn
412E0100	Bridge Repainting, Class I	Lump Sum	LS

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-288	3	26

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: http://www.sddot.com/resources/Manuals/EnvironProcManual.pdf

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Office at 605-773-3098 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

The Contractor shall not withdraw water directly from streams of the James, Big Sioux and Vermillion watersheds without prior approval from the SDDOT Environmental Office.

Action Taken/Required:

The Contractor shall obtain the necessary permits from the regulatory agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE) prior to executing water extraction activities.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the Public ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating No Dumping Allowed.

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

Cost associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow 30 Days from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

MAINTENANCE OF TRAFFIC

Unless otherwise stated in these plans, no work will be allowed during hours of darkness.

Sufficient traffic control devices have been included in these plans to sign one Work Zone Speed Reduction for Interstate Highways and one Lane Closure Using Stop Signs.

The Contractor may provide a shadow vehicle with a crash attenuator approved for approaching vehicle speeds within the interstate lane closure in advance of the work activity when workers are present at the structures. At no time shall any equipment or supplies be located between the crash attenuator and approaching traffic. The vehicle and crash attenuator is intended to provide protection for the workers and the public.

Cost for the shadow vehicle and crash attenuator shall be incidental to the contract unit prices for the various traffic control items.

The WORK ZONE SPEED REDUCTION FOR INTERSTATE HIGHWAYS temporary traffic control zone shall be used to maintain traffic in the westbound passing lane of Interstate 90 below the structure.

The LANE CLOSURE USING STOP SIGNS temporary traffic control zone shall be used to maintain traffic in the northbound lane of the crossroad over Interstate 90. Lane closure centerline channelizing devices must be maintained on the crossroad centerline.

SHEETING FOR TRAFFIC CONTROL SIGNS

All fluorescent orange background material on traffic control signs, all temporary delineators, and all temporary STOP (R1-1), YIELD (R1-2), DO NOT ENTER (R5-1), and WRONG WAY (R5-1a) signs shall conform to the requirements of ASTM D4956 Type IX or XI. All other traffic control signs and background colors shall conform to the requirements of ASTM D4956 Type IV.

TEMPORARY PAVEMENT MARKING

Temporary pavement marking in lane closure and tapers shall consist of temporary raised pavement markers. (Estimate one workspace with 960’ taper and 800’ tangent section on Interstate 90=1,760.)

TEMPORARY PAVEMENT MARKING REMOVAL

The Contractor shall remove and dispose of temporary pavement marking. Removal shall be non-destructive to the permanent pavement marking.

In the absence of a signed lane closure, Flagger symbol signs (W20-7) and flaggers, or a shadow vehicle with rotating yellow lights or strobe lights shall be positioned on the shoulder in advance of workers during the removal of temporary pavement marking.

The traffic control device used shall be moved intermittently to provide proper warning of the work operation. A ROAD WORK AHEAD (W20-1), a Workers symbol signs (W21-1) or a BE PREPARED TO STOP (W3-4) warning sign shall be mounted on the rear of the shadow vehicle. The method of traffic control used by the Contractor for this work shall be approved by the Engineer.

Cost for the traffic control to remove the Temporary Pavement Marking shall be incidental to the contract unit price per foot for Temporary Pavement Marking.

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

		CONVENTIONAL ROAD				EXPRESSWAY / INTERSTATE			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	2	30"	5.2	10.4		36"	7.5	
R2-1	SPEED LIMIT 45		24" x 30"	5.0		2	36" x 48"	12.0	24.0
R2-1	SPEED LIMIT 65		24" x 30"	5.0		3	36" x 48"	12.0	36.0
R2-1	SPEED LIMIT 80		24" x 30"	5.0		1	36" x 48"	12.0	12.0
R2-6aP	FINES DOUBLE (plaque)		24" x 18"	3.0		1	36" x 24"	6.0	6.0
W1-3	REVERSE TURN (L or R)	1	48" x 48"	16.0	16.0		48" x 48"	16.0	
W3-1	STOP AHEAD (symbol)	2	48" x 48"	16.0	32.0		48" x 48"	16.0	
W3-5	SPEED REDUCTION AHEAD (__ MPH)		48" x 48"	16.0		3	48" x 48"	16.0	48.0
W4-2	LEFT or RIGHT LANE ENDS (symbol)		48" x 48"	16.0		2	48" x 48"	16.0	32.0
W13-1P	ADVISORY SPEED (plaque)	2	30" x 30"	6.3	12.6		30" x 30"	6.3	
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0		48" x 48"	16.0	
W20-5	LEFT or RIGHT LANE CLOSED AHEAD		48" x 48"	16.0		2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)		48" x 48"	16.0		1	48" x 48"	16.0	16.0
G20-2	END ROAD WORK		36" x 18"	4.5		1	48" x 24"	8.0	8.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			135.0	EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT			246.0

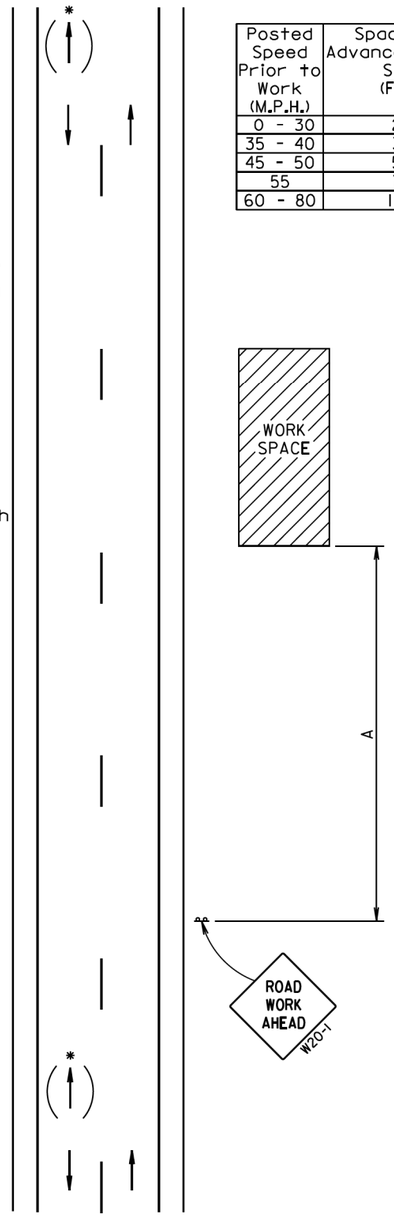
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

* If the work space is on a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.

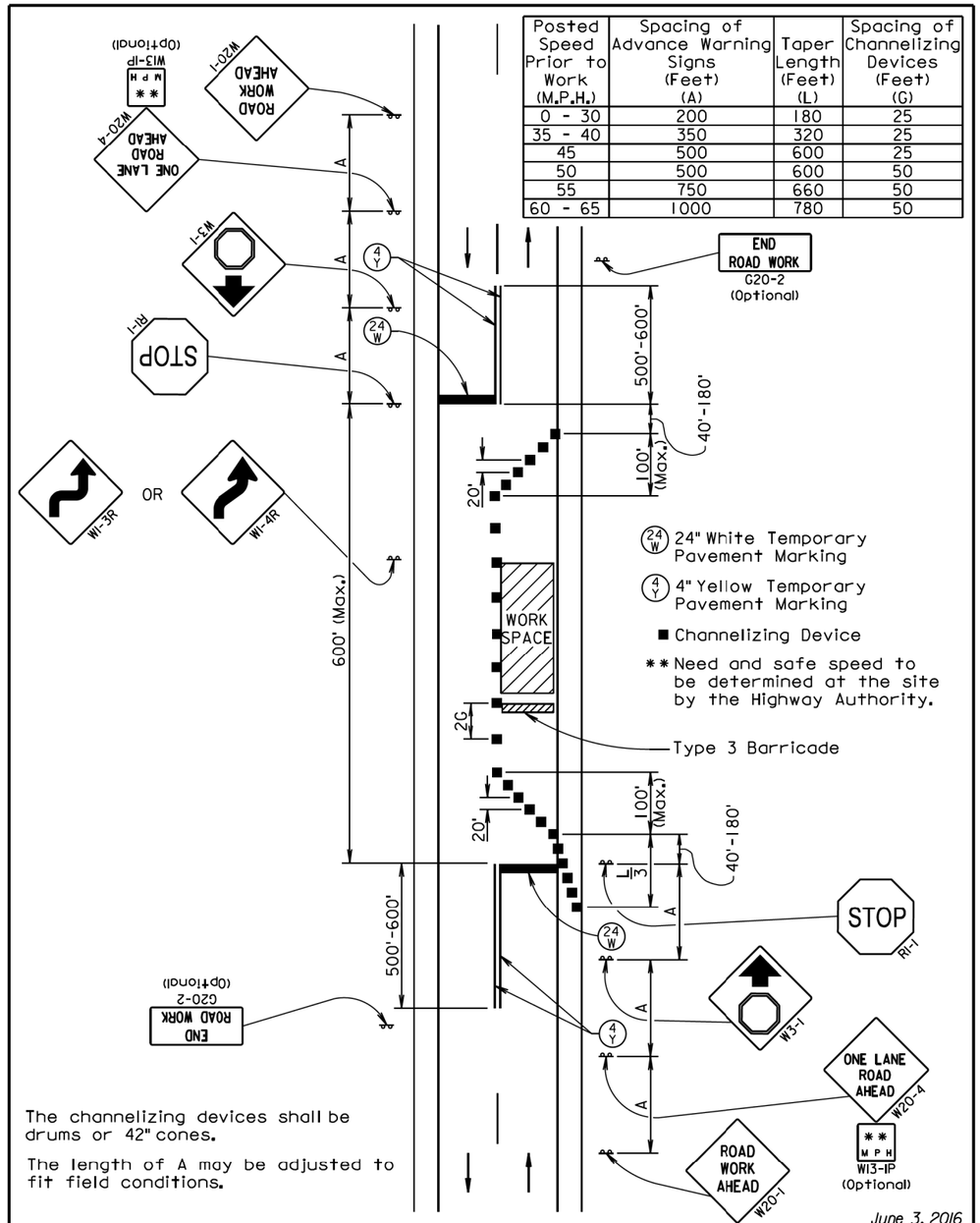
For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 80	1000

April 15, 2015

Published Date: 4th Qtr. 2018	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES WORK BEYOND THE SHOULDER	PLATE NUMBER 634.01 Sheet 1 Of 1



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45	500	600	25
50	500	600	50
55	750	660	50
60 - 65	1000	780	50

The channelizing devices shall be drums or 42" cones.

The length of A may be adjusted to fit field conditions.

June 3, 2016

Published Date: 4th Qtr. 2018	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25 Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
	(A) (B) (C)
70 - 80	1000 1500 2640

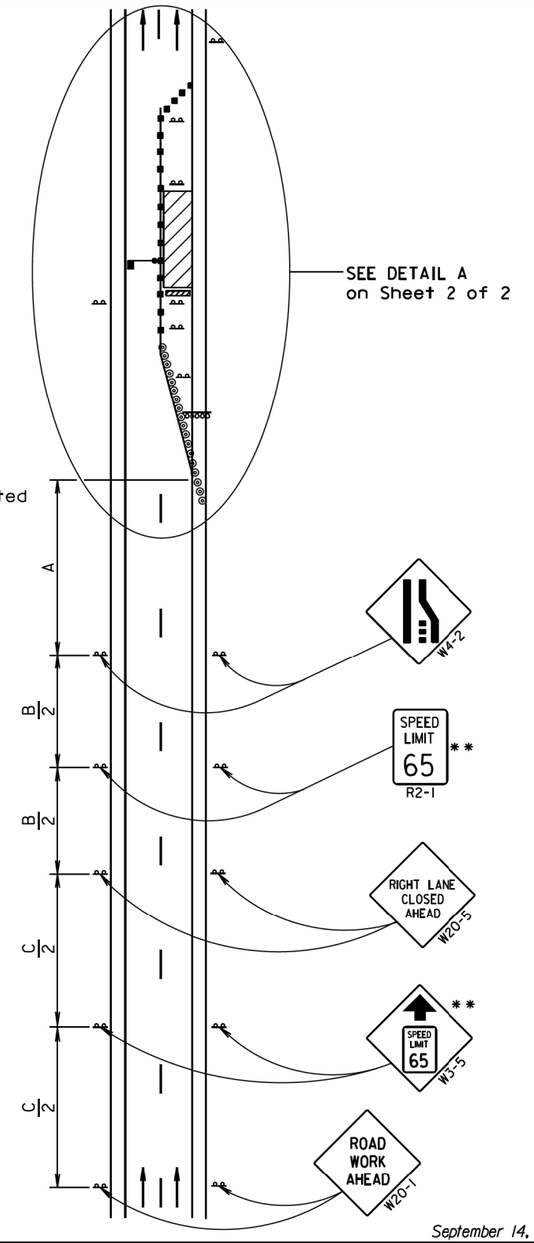
** Speed appropriate for location.

◎ Reflectorized Drum

■ Channelizing Device

ROAD WORK AHEAD sign is only required in advance of the first lane closure.

High speed is defined as having a posted speed limit greater than 45 mph.



September 14, 2018

Published Date: 4th Qtr. 2018	SDDOT	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 1 of 2

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 - 30	25	180
35 - 40	25	320
45	25	600
50	50 *	600
55	50 *	660
60 - 65	50 *	780
70 - 80	50 *	960

* Spacing is 40' for 42" cones.

** Speed appropriate for location.

*** Use speed limit designated for the condition when workers are present in the work space. Signs will be covered or removed when workers are not present.

■—● Flagger (As Necessary)

◎ Reflectorized Drum

■ Channelizing Device

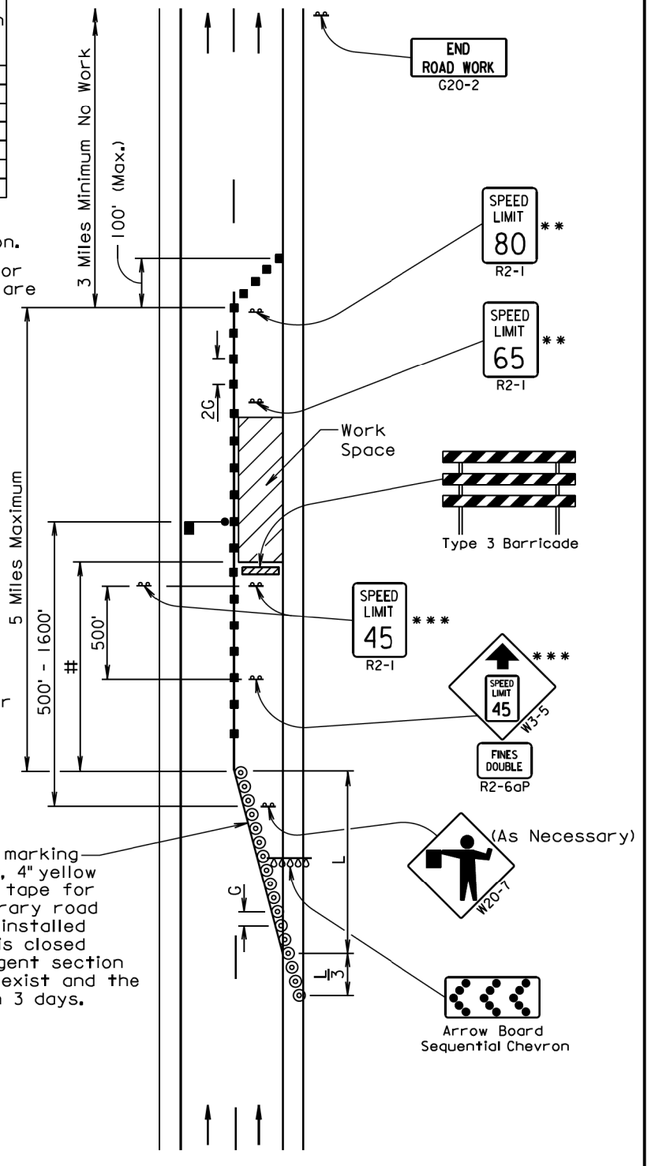
The Work Space will be a minimum of 500' from the end of the taper.

The FLAGGER sign will be used whenever there is a Flagger present.

The channelizing devices will be 42" cones or drums.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

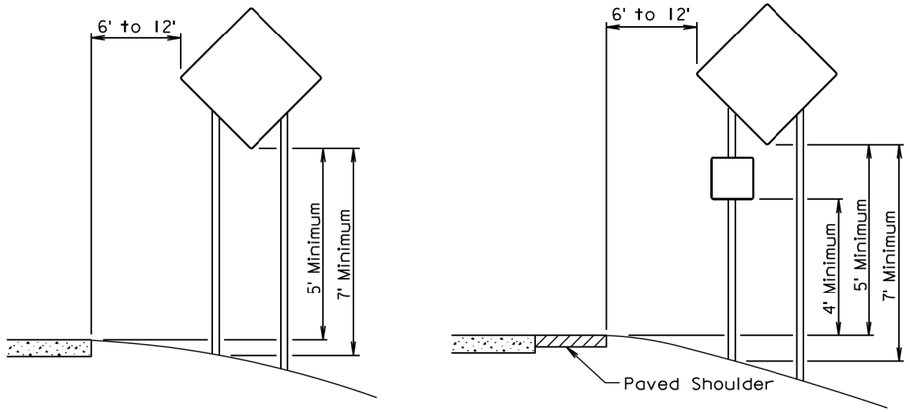
4" white temporary pavement marking tape for right lane closures, 4" yellow temporary pavement marking tape for left lane closures, or temporary road markers at 5' spacing will be installed in the taper when the lane is closed overnight, and along the tangent section where the skip lines do not exist and the lane is closed for more than 3 days.



DETAIL A

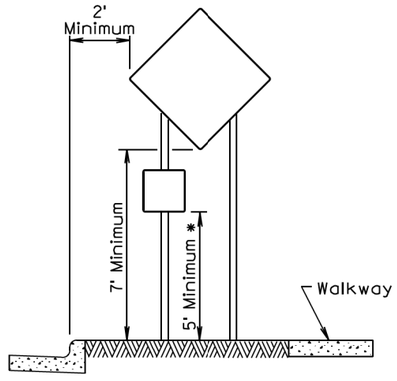
September 14, 2018

Published Date: 4th Qtr. 2018	SDDOT	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 2 of 2



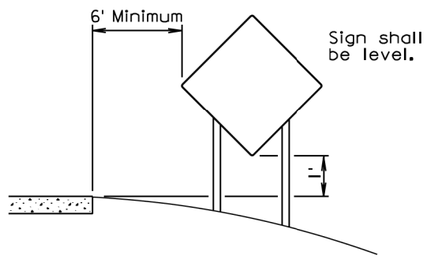
RURAL DISTRICT

RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

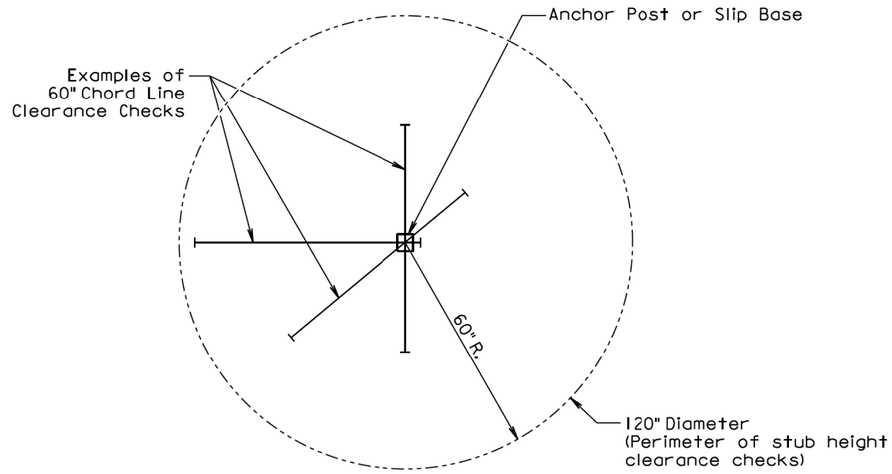
* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



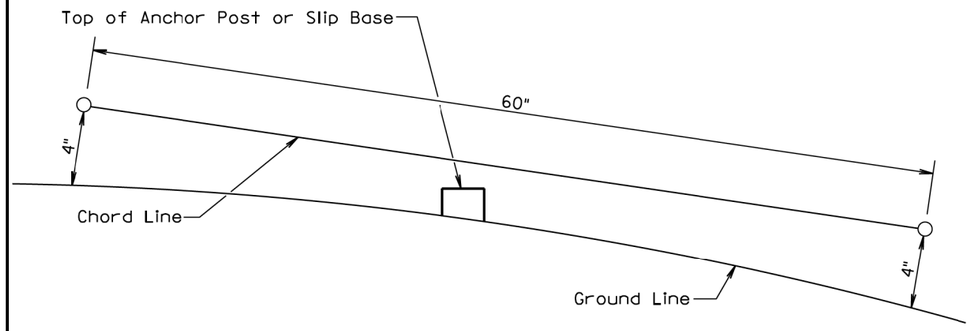
RURAL DISTRICT
3 DAY MAXIMUM
(Not applicable to regulatory signs)

September 22, 2014

Published Date: 4th Qtr. 2018	SDDOT	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

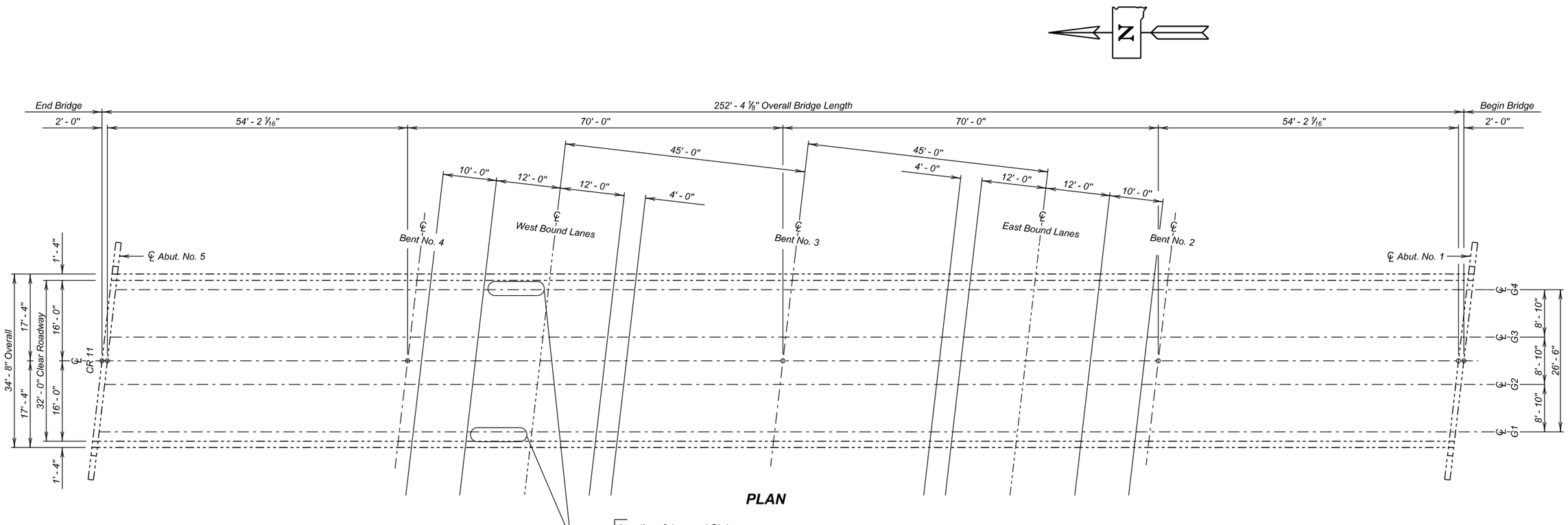
At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 4th Qtr. 2018	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	8	26



PLAN

ELEVATION

INDEX OF BRIDGE SHEETS -

LAYOUT FOR UPGRADE

FOR

252' - 4⅛" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I90
STR. NO. 02-040-149
PCN I4K8

6° 39.5' SKEW L.H.F
SEC. 15/14 - T103N-R66W
090 W - 288

AURORA COUNTY

S. D. DEPT. OF TRANSPORTATION

NOVEMBER 2017

1 OF 19

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM	RS	CM	Steve A Johnson BRIDGE ENGINEER
AUROI4K8	I4K8MA01		

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E0250	Heat Straighten Steel Member(s)	Lump Sum	LS
410E0520	Surface Grinding of Structural Steel	84	SqIn
410E3010	Magnetic Particle Weld Inspection	236	In
410E3030	Magnetic Particle Weld Inspection, Impact Damage Repair	2651	SqIn
412E0100	Bridge Repainting, Class I	Lump Sum	LS

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Load Factor Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

PRE-CONSTRUCTION MEETING

A pre-construction meeting is required prior to beginning the repair work. The purpose of the meeting is to review the plans and procedures because of the specialty work involved. At a minimum, a representative from the Contractor and all Subcontractors shall attend this meeting along with Department personnel from the Area Office and Bridge Office. The contractor must notify the Bridge Construction Engineer and the Area Office at least three days prior to the meeting.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

NOTICE - LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure is a paint containing lead. The Contractor should plan his/her operations accordingly, and inform his/her employees of the hazards of lead exposure.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer a minimum of two weeks prior to the pre-construction meeting.

1. Nondestructively Test impact areas on the bottom flanges of girders G1 and G4 at the locations shown in the plans. Grind nicks and gouges in the flange as necessary.

2. Nondestructively Test fillet welds, crack tips and potential crack tips at the locations shown in the plans prior to and after heat straightening and after all repairs are complete.

3. No traffic shall be allowed above the girder during any heat straightening or splice bolt replacement.

4. Repair crack tips found by Nondestructive Testing prior to and after heat straightening.

5. Heat straighten damaged girder G1 including web and bottom flange.

6. Replace high strength bolts in field bolted girder splice at girder G1.

7. Paint all work areas.

WELD INSPECTION & NONDESTRUCTIVE TESTING (NDT)

1. The Contractor shall be responsible for retaining a qualified Testing Agency to perform Visual and Magnetic Particle (MT) inspection of existing welds and to locate existing and potential crack tips. Inspectors performing Visual and MT inspection and crack tip location shall be certified in accordance with Section 410.3 D of the Construction Specifications. The Contractor shall submit the Testing Agency to the Department at the Preconstruction meeting for approval by the Bridge Construction Engineer.

2. All Nondestructive Testing (NDT) and inspection shall be done in accordance with Clause 6 of the Bridge Welding Code. The MT inspection shall be performed by the yoke method using half-wave rectified direct or alternating current. Existing paint shall be removed from the steel surfaces that require NDT. MT inspection results shall be reported on Form N-7 of Annex L of the Bridge Welding Code.

3. The existing fillet welds noted below shall be 100% visually inspected and 100% magnetic particle inspected. In addition, all of the structural steel elements in the length of girder G1 shown in the heat straightening zone of the plans shall be visually inspected for possible cracks. Defects shall be clearly marked on the girder in accordance with the Bridge Welding Code and a written record of the defects shall be given to the Engineer for transmittal to the Bridge Construction Engineer. Any suspected cracks shall be verified by magnetic particle inspection with the crack tips located. Crack tip locations shall be clearly marked on the girder and a written record of the crack tip location shall be given to the Engineer for transmittal to the Bridge Construction Engineer. Notify the Bridge Construction Engineer if any cracks or crack tips are located in the girder flange. Testing for defects and crack tips shall be made prior to any heat straightening. Repair options for the defects and crack tips shall be determined by the Bridge Construction Engineer - see note on REPAIRS FOR NDT DETERMINED FLAWS. Repairs shall be made prior to any heat straightening.

4. Work areas that are to receive non-destructive testing on G1 and G4 shall be solvent cleaned to SSPC SP-1 prior to any other work being done on the structure.

5. Existing weld and impact MT testing locations:

   Girder 4:

   Test both sides (top and bottom) of the bottom flange 6 inches beyond each side of the existing affected area shown. The estimated area for MT inspection is 353 square inches.

   Girder 1:

   Test the areas on both sides of the web and bottom flange as shown on the plans. The estimated area for MT inspection is 1149 square inches.

   Diaphragm and Transverse Stiffener:

   Test weld locations of the existing transverse and diaphragm stiffener next to the bolted splice on girder G1. The estimated length for the MT inspection is 108 linear inches

   Diaphragm Connections:

   Test the connection of the diaphragm bottom leg to the diaphragm stiffener on girder G1. The estimated length for the MT inspection is 10 linear inches

6. After heat straightening, secondary cracks that develop will require MT weld inspection. The areas listed above shall be retested to ensure no additional cracks have developed. The estimated weld length and area for re-testing is 118 linear inches and 1149 square inches.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

252' - 4⅛" CONT. COMP. GIRDER BRIDGE

STR. NO. 02-040-149

NOVEMBER 2017

2 OF 19

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM	RS	CM	Steve A Johnson BRIDGE ENGINEER
AUROI4K8	I4K8MA02		

WELD INSPECTION & NONDESTRUCTIVE TESTING (NDT) (CONTINUED)

7. All costs including labor, equipment and any incidentals necessary to perform the visual inspection, magnetic particle inspection and crack tip location shall be incidental to the contract unit price per square inch for MAGNETIC PARTICLE WELD INSPECTION, IMPACT DAMAGE REPAIR.

8. All costs to remove the paint and clean all fillet welds to be non destructive tested and remove the paint and clean all visible or potential crack tip locations shall be incidental to the contract unit price per inch for MAGNETIC PARTICLE WELD INSPECTION or contract unit price per square inch for MAGNETIC PARTICLE WELD INSPECTION, IMPACT DAMAGE REPAIR.

9. The total plans quantity for MT weld inspection is only an estimate. The weld inspection will be measured and paid for as MAGNETIC PARTICLE WELD INSPECTION and MAGNETIC PARTICLE WELD INSPECTION, IMPACT DAMAGE REPAIR.

REPAIRS FOR NDT DETERMINED FLAWS

Any flaws or defects discovered during visual inspection and nondestructive testing shall be reported by the Contractor to the Bridge Construction Engineer. The Bridge Construction Engineer will determine the necessary repairs for determined flaws.

HEAT STRAIGHTENING

1. This Contract includes heat straightening of steel Girder G1 including bottom flange and web. Heat straightening is considered specialty work for which only the following contractors are allowed to do this work. Contact:

   Judd Holt
   International Straightening Incorporated
   901 E. Bristol Drive
   Bismarck, ND 58501
   Telephone (701) 223-5972 or (701) 751-1683
   Fax (701) 751-1683
   E-mail isisteel@gmail.com
   www.steelstraightening.com

   Darryl Thomas
   Flame On, Inc.
   4415 Tom Marks Road
   Snohomish, WA 98290
   Telephone (425) 397-7039
   Fax (425) 397-7002
   Cellular (425) 501-9855
   www.flameoninc.com

2. Heat Straightening requires nondestructive testing of both new and existing welds. The Contractor shall use a qualified testing agency subject to the approval by the Bridge Construction Engineer. The Contractor shall submit the testing agency to the Department at the Preconstruction meeting for approval by the Bridge Construction Engineer. See Weld Inspection & Nondestructive Testing notes elsewhere in these plans.

3. The equipment used for heat straightening shall be an oxygen-fuel combination. The fuel shall be propane or acetylene. The application of heat shall be by single or multiple orifice tips only. The size of the tip shall be proportional to the thickness of the heated material. As a guide, the following table shows the recommended tip sizes.

Steel Thickness (in)	Orifice Type	Size
< 1/4	Single	3
3/8	Single	4
1/2	Single	5
5/8	Single	7
3/4	Single	8
1	Single or Rosebud	8 3
2	Single or Rosebud	8 4
3	Rosebud	5
>4	Rosebud	5

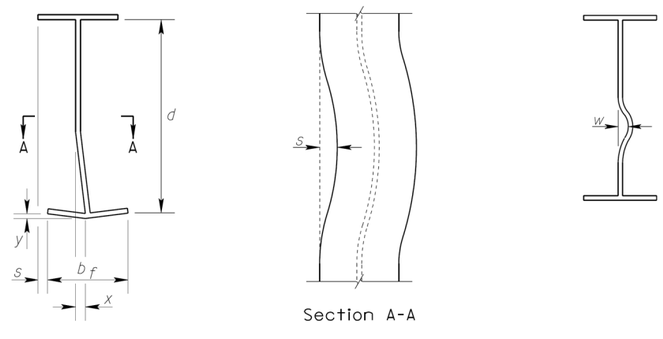
4. The temperature of all steel during heat straightening shall not exceed 1,200°F. The Contractor shall use one or more of the following methods for verifying temperatures during heat straightening:

   a. Temperature sensitive crayons
   b. Pyrometer
   c. Infrared non-contact thermometer

   Material should be heated in a single pass and shall be allowed to air cool to below 250°F prior to re-heating.

5. Hot Mechanical Straightening and Hot Working will NOT be allowed.

6. The final dimensions of heat straightened structural members shall conform to the following tolerances:



d = original depth of web
b_f = original width of flange

x = final displacement of web ≤ maximum of $\frac{d}{100}$ or ¼"
y = final displacement of edge of flange ≤ ¼"
w = maximum final local deformation in web ≤ ¼"
s = sweep of flange from original edge of flange ≤ ½" over 20 ft

7. All labor, materials, equipment, and any incidentals necessary to perform the required heat straightening shall be incidental to the contract lump sum price for HEAT STRAIGHTEN STEEL MEMBER(S).

REMOVAL OF SURFACE NICKS AND GOUGES

1. Grind the bottom flange of Girders G1 and G4 as directed by the Engineer, to remove all sharp edges from surface nicks and gouges created by vehicle impact. The amount of material removed shall be kept at the absolute minimum necessary to remove the sharp edges and to minimize the section reduction of the existing structural members. Grinding shall be longitudinal. Transverse grinding will not be allowed. The grinding shall be done prior to heat straightening the girder.

2. All surface nicks and gouges shall be checked by non destructive MT testing after grinding--see Weld Inspection & Nondestructive Testing (NDT) note.

3. All costs associated with removing sharp edges from surface nicks and gouges including all materials, equipment and labor shall be incidental to the contract unit price per square inch for SURFACE GRINDING OF STRUCTURAL STEEL. Estimated quantity is 84 square inches. This quantity is included to establish bid prices. SURFACE GRINDING OF STRUCTURAL STEEL will be used and paid for only as determined by the Engineer. This item may not be encountered and could be removed from the plans.

FIELD BOLTED GIRDER SPLICE

1. This work shall consist of replacing bolts located within the heat straightening limits and replacing bolts located in the bottom flange and web plates of girder G1. Half of the bolts on the web plates and all the bolts on the bottom flange splice plates are expected to be affected from the heat straightening process.

2. Bolts shall be ¾" diameter ASTM F3125 Grade A325. Each bolt shall be supplied with a heavy hex nut, 1 hardened washer and 1 direct tension indicator.

NOTES (CONTINUED)
FOR
252' - 4⅛" CONT. COMP. GIRDER BRIDGE

STR. NO. 02-040-149
NOVEMBER 2017

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM	RS	CM	BRIDGE ENGINEER
AUROI4K8	I4K8MA03		

FIELD BOLTED GIRDER SPLICE (CONTINUED)

3. High strength bolts, nuts, washers and direct tension indicators shall be stored in such a manner that they will be kept clean and free from any rust or foreign material.

4. Contact surfaces of the bolted connections shall be clean and free from all oil and paint. Commercial blast cleaning of the contact areas shall be done to SSPC SP 6 finish.

5. Bolts in flanges shall be placed with heads down.

6. Bolts in web splices of exterior girders shall be placed with heads on exterior face of girders.

7. No more than one bolt shall be removed on either side of the splice at any given time.

8. All costs associated with replacing the splice bolts, including all materials, labor, equipment and incidentals shall be incidental to the contract lump sum price for “Structural Steel, Miscellaneous”

BOLT TESTING

The certified mill test reports for all bolts used on the project shall include the test results for all of the testing specified in Section 972.2 D of the South Dakota Standard Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

BRIDGE REPAINTING, CLASS I

1. All existing structural steel within the work affected areas shall be painted. The finished girder shall have a uniform paint appearance as approved by the Engineer. The work affected areas shall be painted for a distance of six inches outside the affected areas on all sides. For informational purposes, the approximate total area under this item of repair is 40 square feet.

2. Paint residue shall be treated as construction debris. Paint residue shall be contained, collected, and disposed of by the contractor in accordance with environmental commitments. Removal and containment will be incidental to the contract lump sum price for Bridge Repainting, Class I.

3. All work affected areas shall be painted in accordance with Section 412 of the Specifications and in accordance with SSPC Standard PA1.

4. Paint color:

   Top Coat - The paint color shall be an approved green color to match the existing paint. Prior to ordering the paint, a paint chip of the green color shall be submitted to the Department for color approval.

   Primer or Intermediate Coats - Colors shall sharply contrast with each other and with the top coat.

NOTES (CONTINUED)

FOR

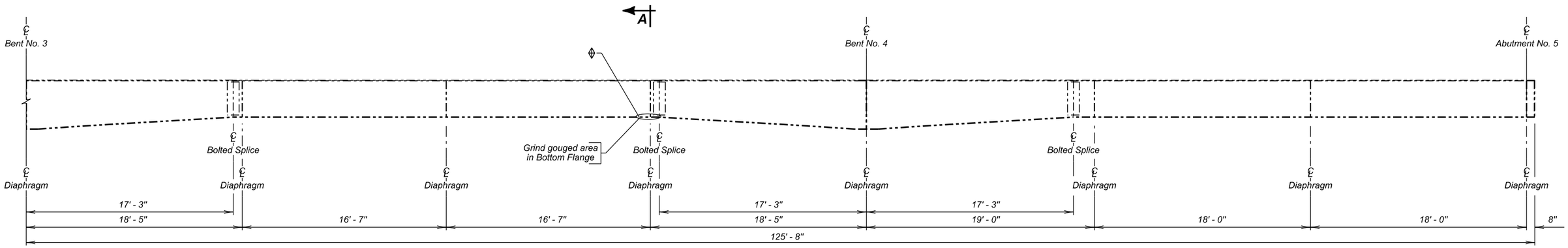
252' - 4⅛" CONT. COMP. GIRDER BRIDGE

STR. NO. 02-040-149

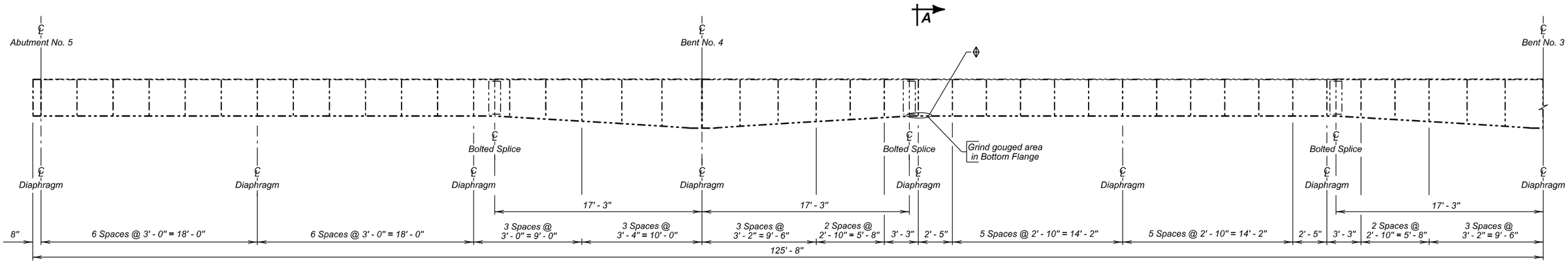
NOVEMBER 2017

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM AUROI4K8	RS I4K8MA04	CM	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	12	26



EAST FACE GIRDER NO. 4
(Outside Face)



WEST FACE GIRDER NO. 4
(Inside Face)

NOTES:
Concrete deck not shown for clarity.
Section A - A is located on Sheet No. 7

◈ *Nondestructive Test impact damage area and welds as indicated.*

NOTE:
This sheet is to be used in conjuction with Sheet Nos. 7 and 8 of 19.

GIRDER NO. 4 REPAIR DETAILS
FOR
252' - 4⅛" CONT. COMP. GIRDER BRIDGE

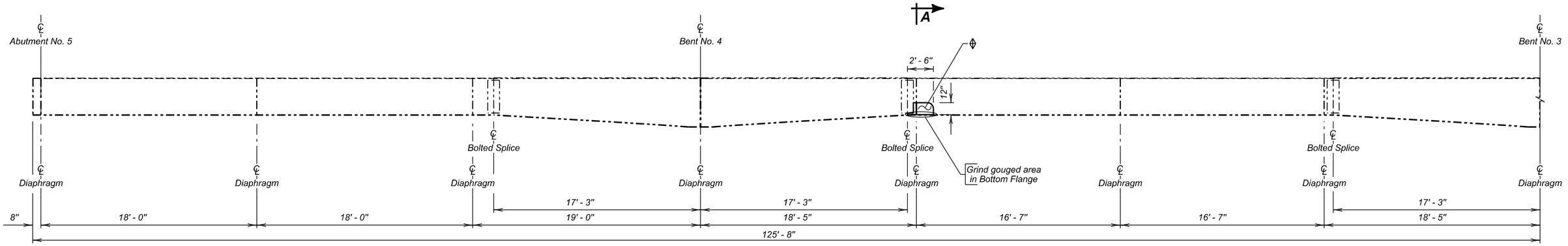
32' - 0" ROADWAY
OVER I90
STR. NO. 02-040-149

6° 39.5' SKEW L.H.F
SEC. 15/14 - T103N-R66W
090 W - 288

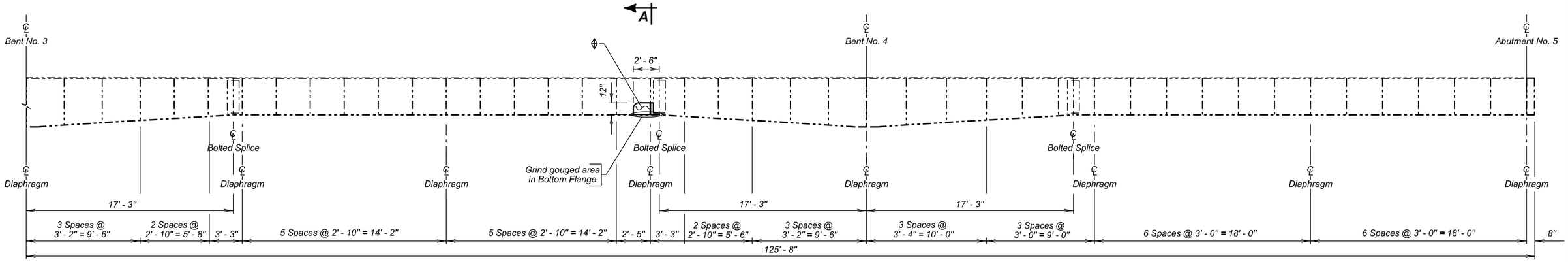
AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2017

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM	RS	CM	Steven A. Johnson BRIDGE ENGINEER
AUROI4K8	I4K8MA05		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	13	26



WEST FACE GIRDER NO. 1
(Outside Face)



EAST FACE GIRDER NO. 1
(Inside Face)

NOTES:
Concrete deck not shown for clarity.
Section A - A is located on Sheet No. 7

◈ *Nondestructive Test impact damage area and welds as indicated.*

NOTE:
This sheet is to be used in conjuction with Sheet Nos. 7 and 8 of 19.

GIRDER NO. 1 REPAIR DETAILS
FOR
252' - 4⅛" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I90
STR. NO. 02-040-149

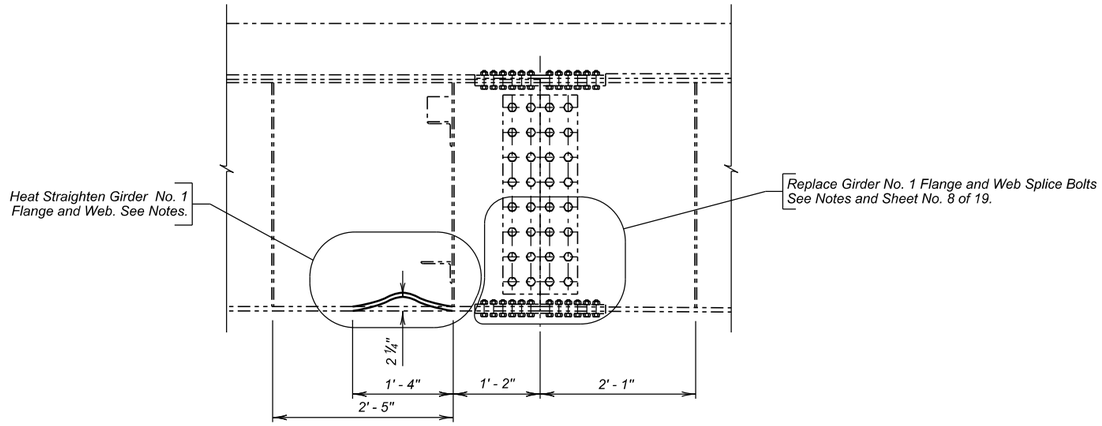
6° 39.5' SKEW L.H.F
SEC. 15/14 - T103N-R66W
090 W - 288

AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2017

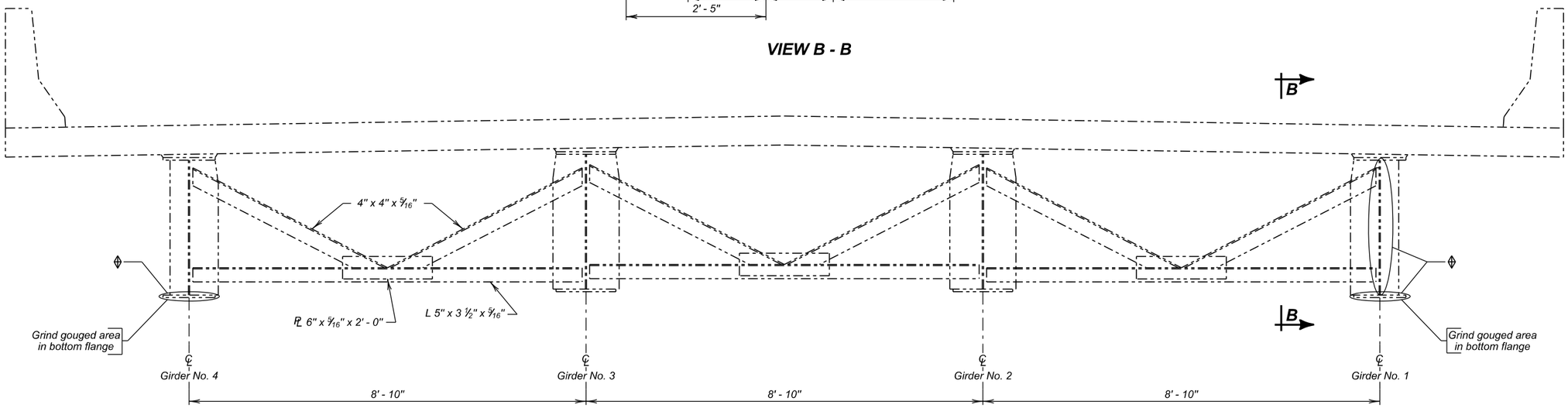
6 OF 19

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM	RS	CM	Steve A Johnson BRIDGE ENGINEER
AUROI4K8	I4K8MA06		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	14	26



VIEW B - B



SECTION A - A

(For location of Section, see Sheet Nos. 5 and 6 of 19)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
~~Incidental Work, Structure~~	~~Lump Sum~~	~~LS~~
Heat Striaghten Steel Member(s)	Lump Sum	LS
Surface Grinding of Structural Steel	84	SqIn
Magnetic Particle Weld Inspection	236	In
Magnetic Particle Weld Inspection, Impact Damage Repair	2651	SqIn
⌀ Bridge Repainting, Class I	Lump Sum	LS

Item listed below is approximate quantity and is for informational purposes only.

⌀ *Bridge Repainting, Class I* — *40 Sq Ft.*

⟠ *Nondestructive Test impact damage area and welds as indicated.*

GIRDER NOS. 1 AND 4 REPAIR DETAILS

FOR

252' - 4⅛" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I90
STR. NO. 02-040-149

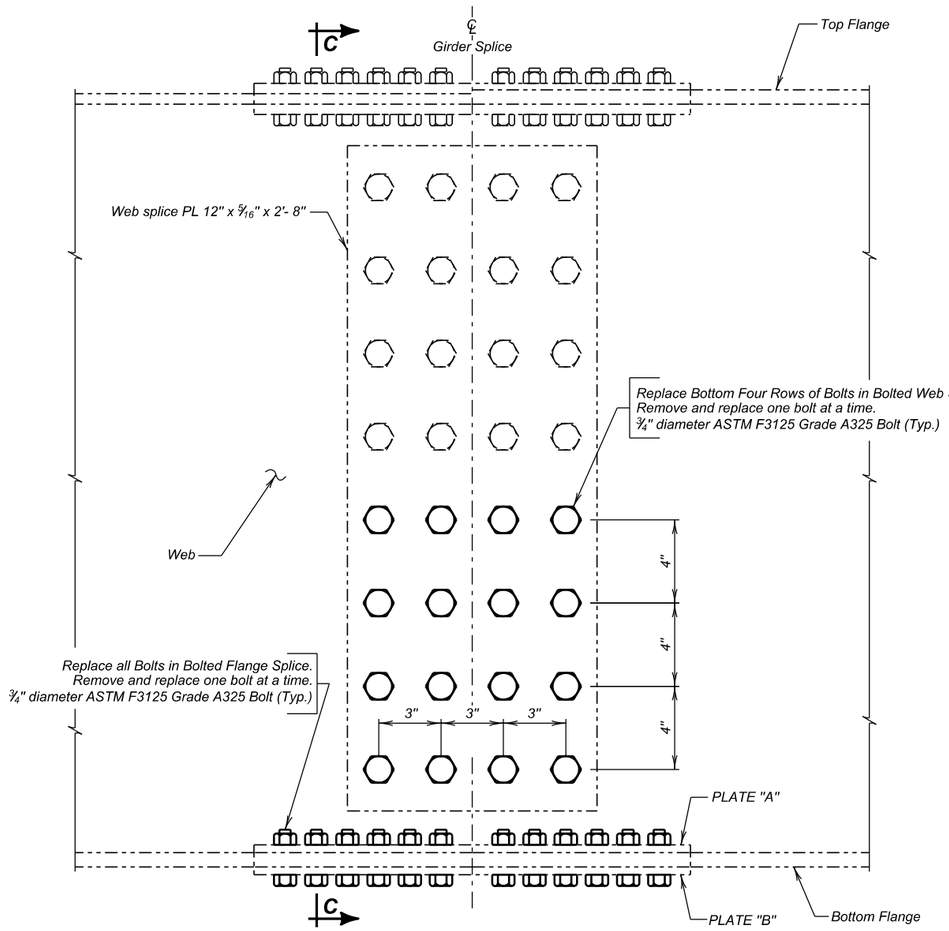
6° 39.5' SKEW L.H.F
SEC. 15/14 - T103N-R66W
090 W - 288

AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2017

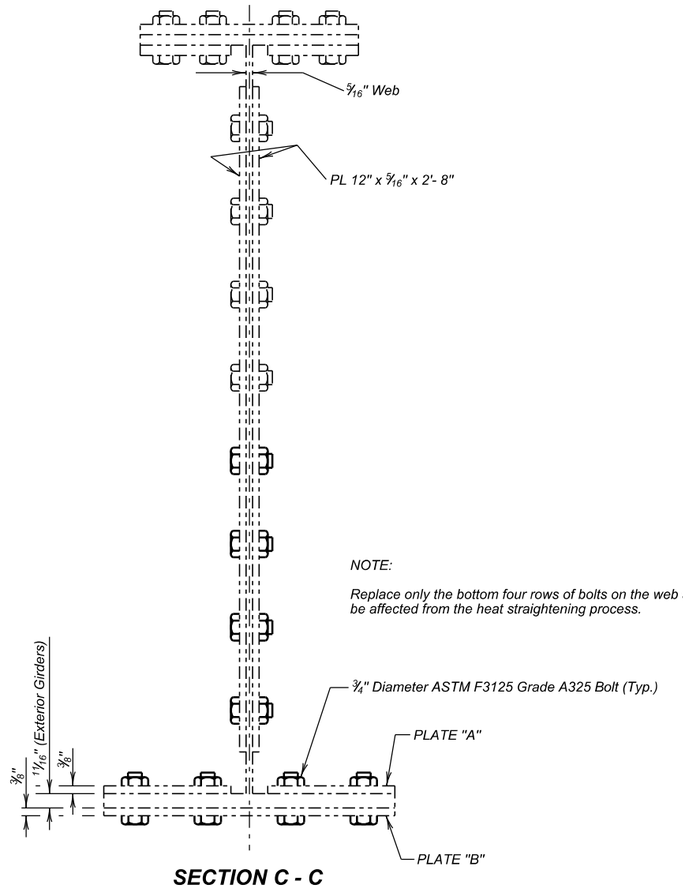
7 OF 19

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM	RS	CM	Steve A. Johnson BRIDGE ENGINEER
AUROI4K8	I4K8MA07		

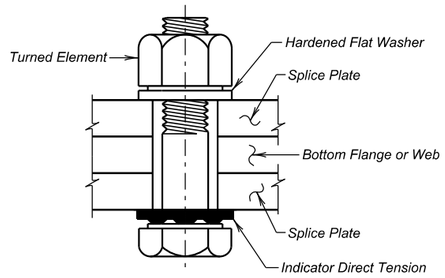
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	15	26



ELEVATION OF SPLICE



SECTION C - C



DIRECT TENSION INDICATOR DETAIL

NOTE:

Replace only the bottom four rows of bolts on the web splice. These bolts are anticipated to be affected from the heat straightening process.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Structural Steel, Miscellaneous	LS	Lump Sum

For informational purposes only, the estimated weight of the structural steel is 30 pounds.

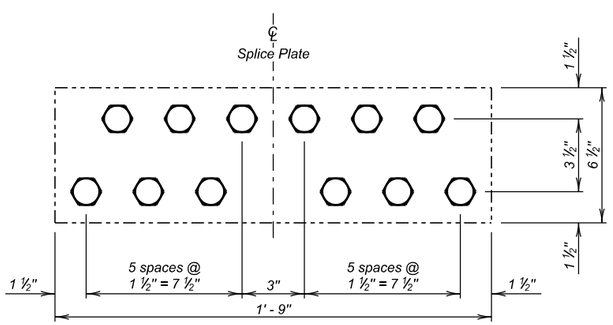


PLATE "A"

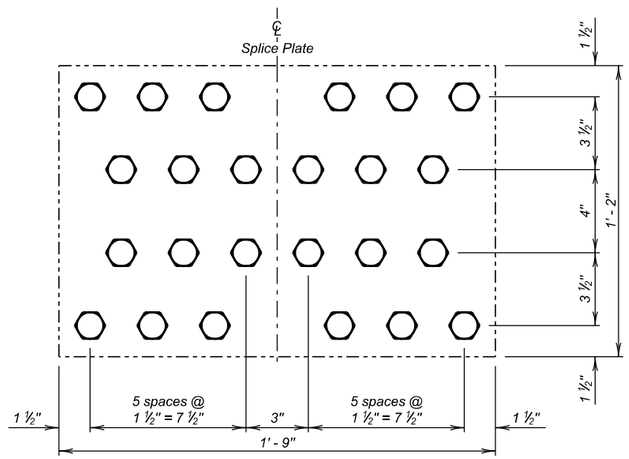


PLATE "B"

GIRDER NO. 1 SPLICE DETAILS
FOR
252' - 4⅛" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I90
STR. NO. 02-040-149

6° 39.5' SKEW L.H.F
SEC. 15/14 - T103N-R66W
090 W - 288

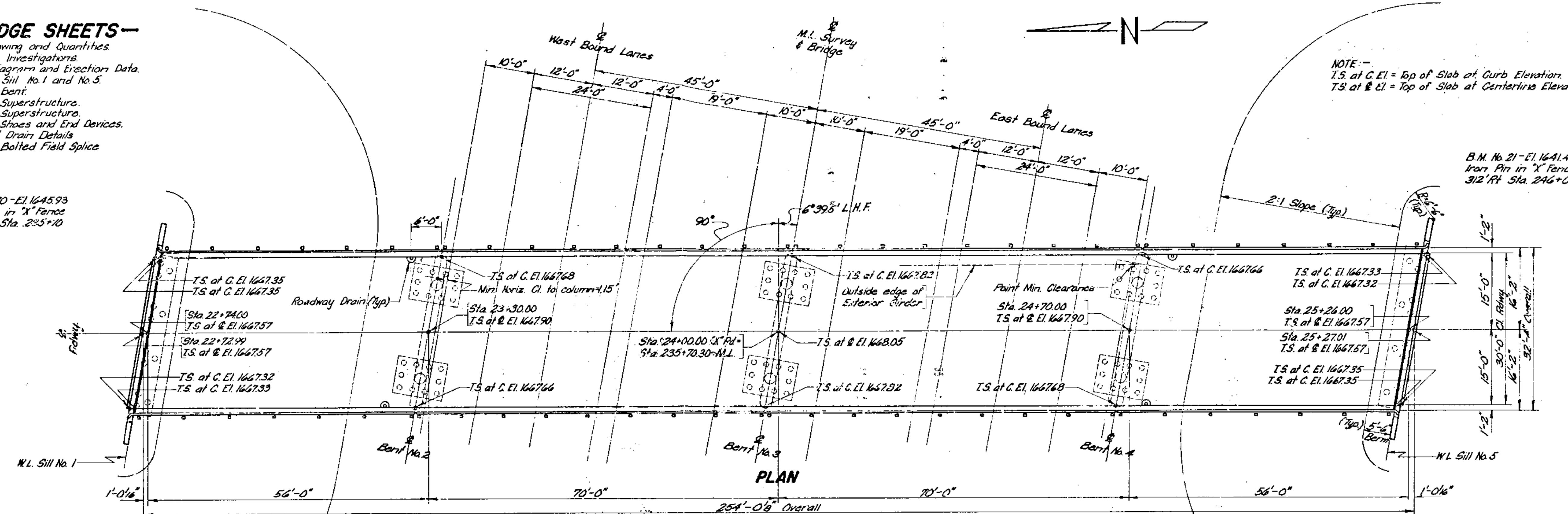
AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2017

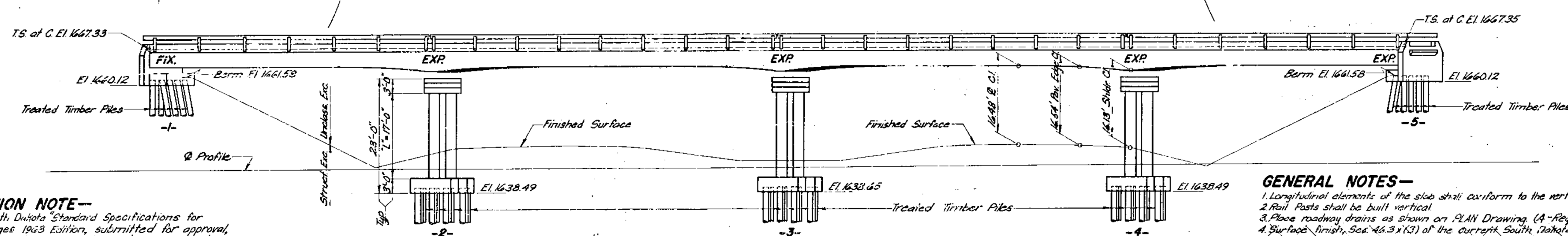
DESIGNED BY	CK. DES. BY	DRAFTED BY	
CM	RS	KR	Steve A Johnson BRIDGE ENGINEER
AUROI4K8	I4K8MA08		

-X771-

INDEX OF BRIDGE SHEETS—

NOTE:—
T.S. at C El. = Top of Slab at Curb Elevation.
T.S. at ℄ El. = Top of Slab at Centerline Elevation.



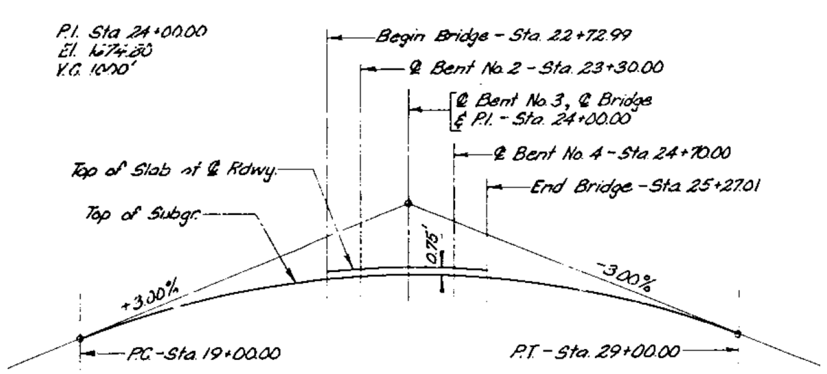


GENERAL NOTES—

1. Longitudinal elements of the slab shall conform to the vertical curve.
2. Rail Posts shall be built vertical.
3. Place roadway drains as shown on PLAN Drawing. (4-Req'd)
4. ~~Surface finish, Sec. 46.3 x (3) of the current South Dakota Standard Specifications, shall also include such portions of the structure which are visible from any traveled lane.~~

SPECIFICATION NOTE—

Use South Dakota "Standard Specifications for Roads and Bridges 1963 Edition, submitted for approval, and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal."



SUBGRADE CURVE DATA

ESTIMATED QUANTITIES

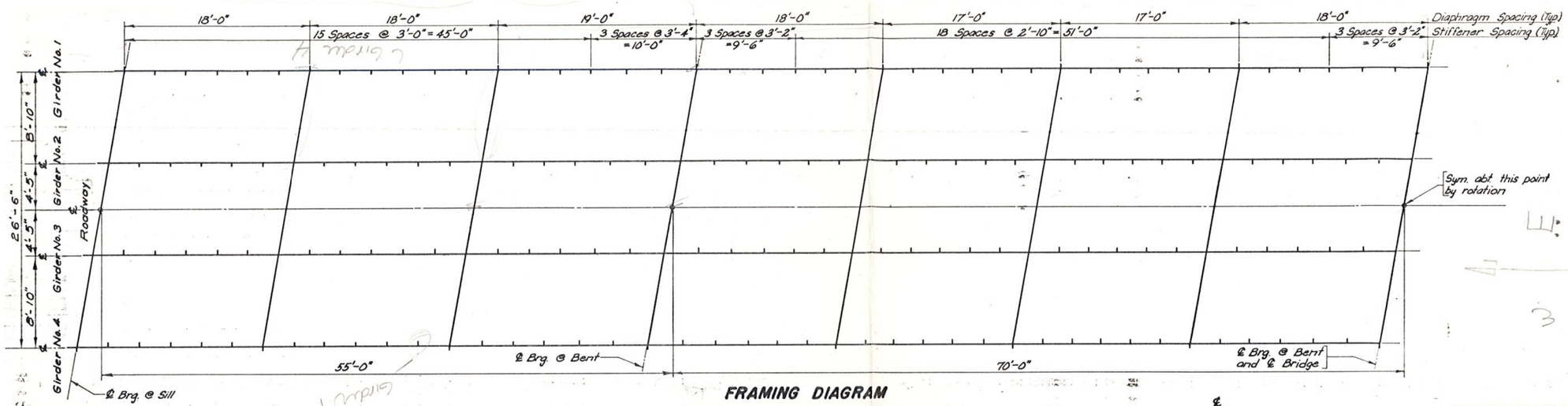
ITEM	Cl. "A" Concrete Cu. Yds.	Steel - lbs. Reinf.	Steel - lbs. Struct.	Type "A" Steel Railing - Lin. Ft.	Timber Piles - Lin. Ft. Treated Timber	Timber Piles - Lin. Ft. ϕTest	Excavation - Cu. Yds. Struct.	Excavation - Cu. Yds. ΔUnclass.
Superstructure	191.6	59,045	132,795	510.3				
Sill No. 1	22.9	2,215	540		11@50'=550	1@55'=55	17	
Sill No. 5	22.9	2,215	865		11@45'=495	1@50'=50	17	
Bent No. 2	34.6	7,645			19@25'=475	1@30'=30	79	
Bent No. 3	34.6	7,645			19@25'=475	1@30'=30	48	
Bent No. 4	34.6	7,645			19@25'=475	1@30'=30	79	
			132,732					
Totals	341.2	85,410	134,200	510.3	2,470	195	240	Δ

ΔAll Unclassified Excavation to be done by others
ϕOne Treated Timber Test Pile shall be driven at Sill No. 1 and Sill No. 5 and Bents No. 2, 3 and 4 before remaining piles are ordered.
PILE NOTE:—Piles driven at Sills No. 1 & No. 5 including test piles, shall obtain their full bearing (24 Tons) in the natural ground below the new embankment, elevations 1642.0± and 1644.1± respectively. Pre-bored holes thru the fill to natural ground are required, and shall have a minimum diameter 2" larger than the nominal diameter (3' from butt) of the pile.

ORIGINAL CONSTRUCTION PLANS

GENERAL DRAWING AND QUANTITIES
FOR
254'-0 1/8" CONT. COMP. GIRDER VIADUCT
30'-0" ROADWAY 6° 39.5' SKEW L.H.F.
OVER I.S. NO. 90 STA. 235+70.30 SEC. 15/14-T103N-R66W
STA. 22+72.99 TO 25+27.01 I 90-7(8)295
AURORA COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
SEPT. 1963
-X771-
STR. NO. 02-040-149

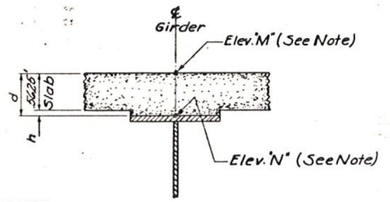
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	17	26



FRAMING DIAGRAM

TABLE OF SLAB FORM ELEVATIONS AND COMPUTATIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Girder No.1	Elev. M	1667.386	1667.511	1667.599	1667.660	1667.703	1667.789	1667.855	1667.860	1667.843	1667.856	1667.848	1667.780	1667.690	1667.644	1667.581	1667.491	1667.363
	(-) Elev N																	
	(=) d																	
	(-) 0.563'																	
	(=) h																	
Girder No.2	Elev. M	1667.516	1667.642	1667.731	1667.792	1667.836	1667.924	1667.990	1667.997	1667.981	1667.995	1667.988	1667.921	1667.832	1667.787	1667.725	1667.635	1667.509
	(-) Elev. N																	
	(=) d																	
	(-) 0.563'																	
	(=) h																	
Girder No.3	Elev. M	1667.509	1667.635	1667.725	1667.787	1667.832	1667.921	1667.988	1667.995	1667.981	1667.997	1667.990	1667.924	1667.836	1667.792	1667.731	1667.642	1667.516
	(-) Elev. N																	
	(=) d																	
	(-) 0.563'																	
	(=) h																	
Girder No.4	Elev. M	1667.363	1667.491	1667.581	1667.644	1667.690	1667.780	1667.848	1667.856	1667.843	1667.860	1667.855	1667.789	1667.703	1667.660	1667.599	1667.511	1667.386
	(-) Elev. N																	
	(=) d																	
	(-) 0.563'																	
	(=) h																	

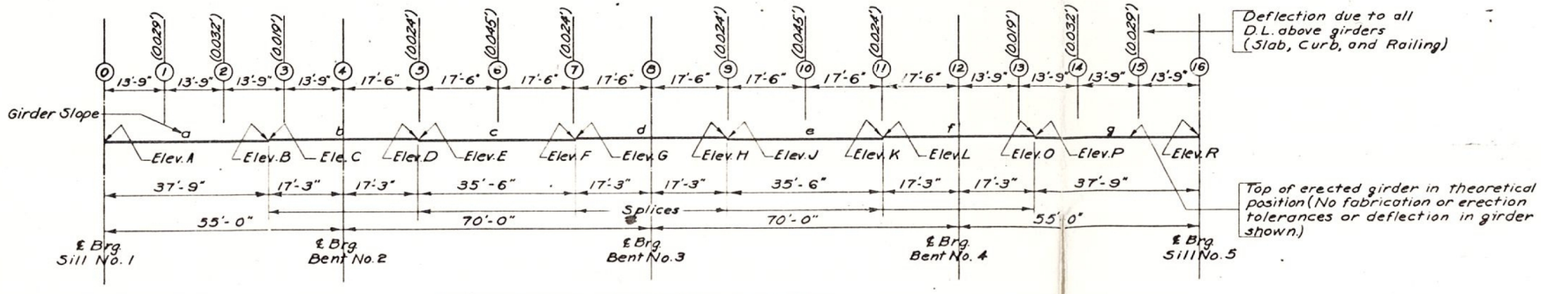


NOTE—

This table contains the necessary information to determine the depth of concrete, in feet, over the girders at the points shown. All calculations can be carried in the spaces provided. Elevation 'M' is the elevation of the top of slab form before any concrete has been poured. This elevation includes correction for vertical curve and deflection due to all D.L. above girders. Elevation 'N' is a field measured elevation taken on top of girders at the points shown. This elevation must be taken after girder erection is completed, but prior to placing any of the concrete. Girders shall not be supported by construction shoring while elevations are taken.

ERECTION ELEVATIONS AND GIRDER SLOPES

Girder No.	Elevations (Top of Girder) A	B	C	D	E	F	G	H	J	K	L	O	P	R	Slopes % a	b	c	d	e	f	g
1	1666.7819	1667.0278	1667.0434	1667.1851	1667.1695	1667.2407	1667.2563	1667.2531	1667.2375	1667.1597	1667.1753	1667.0272	1667.0116	1666.7587	+.65139	+.41072	+.20056	-.00928	-.21915	-.42928	-.66993
2	1666.9120	1667.1603	1667.1759	1667.3197	1667.3041	1667.3775	1667.3931	1667.3921	1667.3765	1667.3008	1667.3164	1667.1705	1667.1549	1666.9043	+.65775	+.41681	+.20676	-.00290	-.21324	-.42290	-.66384
3	1666.9043	1667.1549	1667.1705	1667.3164	1667.3008	1667.3765	1667.3921	1667.3931	1667.3775	1667.3041	1667.3197	1667.1759	1667.1603	1666.9120	+.66384	+.42290	+.21324	+.00290	-.20676	-.41681	-.65775
4	1666.7587	1667.0116	1667.0272	1667.1753	1667.1597	1667.2375	1667.2531	1667.2563	1667.2407	1667.1695	1667.1851	1667.0434	1667.0278	1666.7819	+.66993	+.42928	+.21915	+.00928	-.20056	-.41072	-.65139



ERECTION ELEVATIONS DIAGRAM

SUPERSTRUCTURE NOTES—

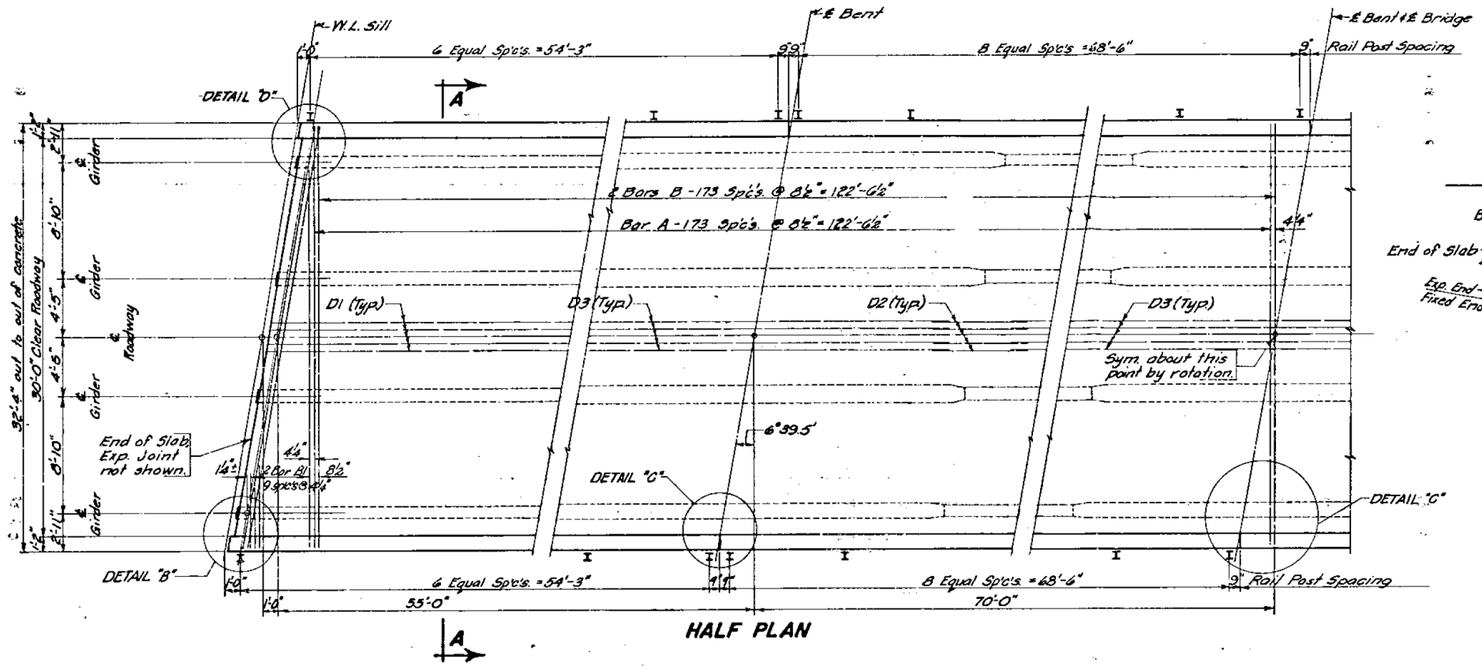
1. Design Specifications: AASHO Specifications for Highway Bridges, 1961 with Interim Specifications for 1961, 1962.
2. Structural Steel members shall conform to A.S.T.M. A36 steel. Steel produced under other Specifications, but shown to possess the chemical and physical properties of A36 steel will be accepted for use where the latter is specified.
3. Structural Steel for shoes shall conform to A.S.T.M. – A36. Steel for pins shall conform to A.S.T.M. – A235 (class E) or A.S.T.M. – A108 (Grade 1021 to 1031, incl.) with a minimum Rockwell scale B hardness of 85. (Material not meeting the Specifications for hardness may be accepted provided it develops a tensile strength of 72,000 p.s.i. and a yield point of 36,000 p.s.i.)
4. Butt welded girder splices, shop or field, shall be radiographically inspected.
5. Cost of welding shall be included in the unit price bid for Structural Steel.
6. Cost of canvas and red lead or preformed fabric pads under bearing plates shall be included in the unit price bid for Structural Steel.
7. Structural Steel shall be painted with one shop coat of Red Lead Paint (AASHO designation M72 Type I) or Red Lead Iron Oxide Paint (AASHO designation M72 Type III) with the requirement calling for cleaning by means of sand-blasting being waived and two field coats of Aluminum Paint (AASHO designation M69). Cost of painting shall be included in the unit price bid for Structural Steel.
8. All Swedge Bolts shall be 1¼"ø with heavy hex nut and cut washer (Listed as Structural Steel in the Superstructure Quantities).
9. Expansion Shoe shall be set vertical at 70°F.
10. All exposed concrete edges shall be chamfered 1" unless otherwise noted.
11. All reinforcing Steel Bars shall conform to A.S.T.M. Specifications A305 and A15 Intermediate Grade.

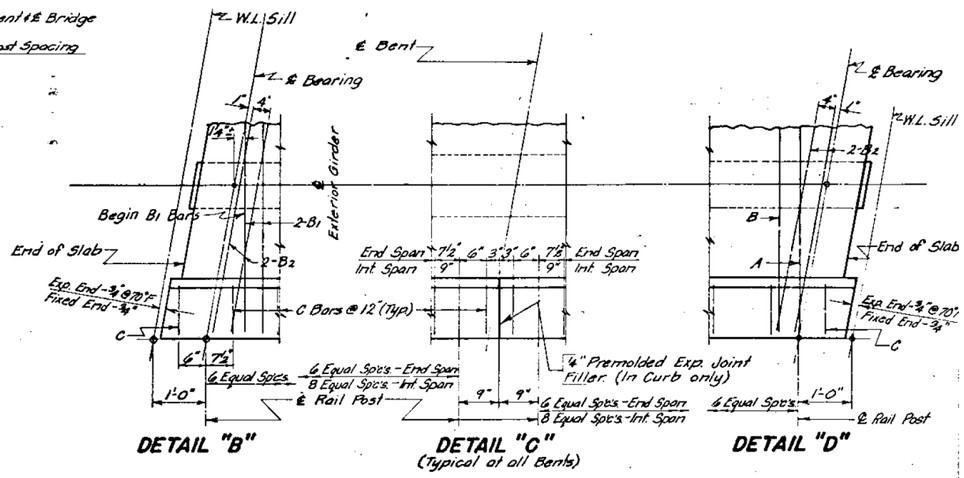
ORIGINAL CONSTRUCTION PLANS

FRAMING DIAGRAM AND ERECTION DATA
FOR
254'-0⅛" CONT. COMP. GIRDER VIADUCT

30'-0" ROADWAY — 6° 39.5' SKEW L.H.F.
OVER I.S. NO. 90 STA. 235+70.30 — SEC. 15/14-T103N-R66W
STA. 22+72.99 TO 25+27.01 — I 90-7(8)295
AURORA COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
SEPT. 1963
STR. NO. 02-040-149

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	18	26

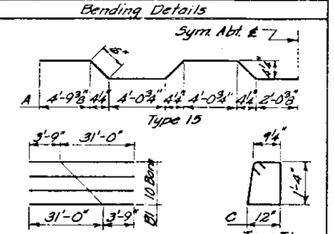




REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
A	348	5	33'-0"	15
B	694	5	32'-0"	Str.
B1	20	5	34'-9"	Str.
B2	8	5	32'-3"	Str.
C	504	4	5'-3"	T1
D1	148	5	37'-0"	Str.
D2	148	5	33'-0"	Str.
D3	222	5	40'-0"	Str.
D4	16	5	28'-9"	Str.
D5	16	5	35'-9"	Str.

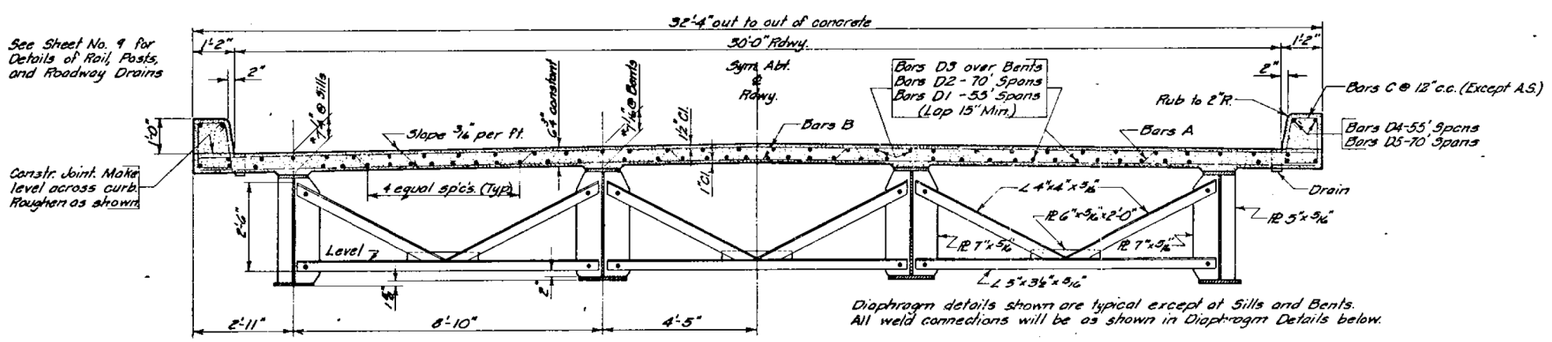
Bending Details



All dimensions are out to out of bars.

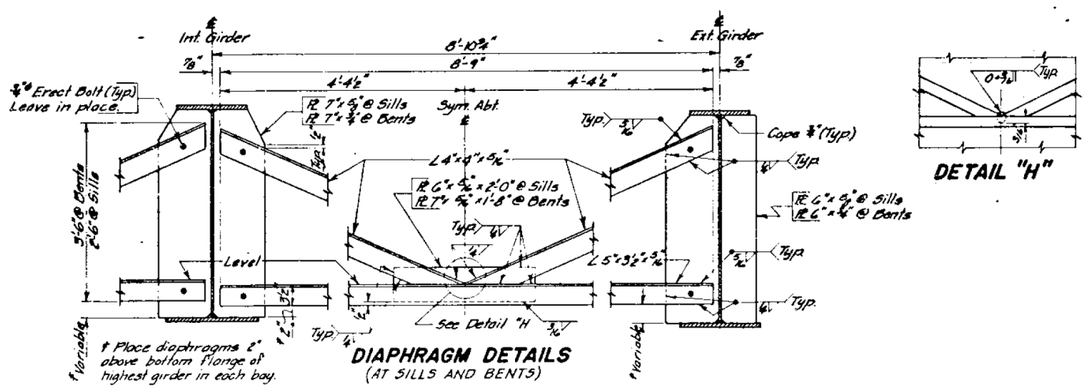
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class "A" Concrete	Cu. Yds.	194
Reinforcing Steel	Lbs.	59,045
Structural Steel	Lbs.	32,795
Type "A" Steel Railing	Lin. Ft.	5103



Diaphragm details shown are typical except at Sills and Bents. All weld connections will be as shown in Diaphragm Details below.

*Dimensions at ℄ of bearings. At interior points dimensions must be corrected according to the erection data on Sheet No. 3.



† Place diaphragms 2" above bottom flange of highest girder in each bay.

CONCRETE PLACING NOTES—

The concrete slab shall preferably be placed in one continuous pour. However, if the Contractor deems it advisable to use construction joints, a plan showing type of joint and pouring procedure shall be submitted to the BRIDGE DIVISION for approval.

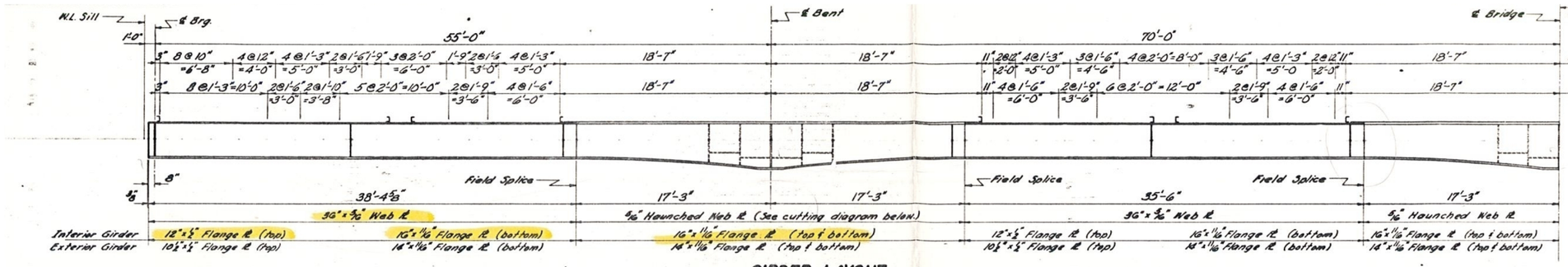
The curb shall be poured after all of the slab has been poured.

Revised from 254'-0⅜" Pennington Co. I 90-2(11)62 — Sta. 124+39.01

ORIGINAL CONSTRUCTION PLANS

DETAILS OF SUPERSTRUCTURE
FOR
254'-0 1/8" CONT. COMP. GIRDER VIADUCT
30'-0" ROADWAY — 6° 39.5' SKEW L.H.
OVER I.S. NO. 90 STA. 235+70.30 — SEC. 15/14-T103N-R66W
STA. 22+72.99 TO 25+27.01 — I 90-7(8)295
AURORA COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
SEPT. 1963
STR. NO. 02-040-149

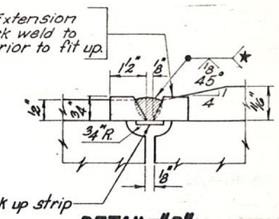
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	19	26



GIRDER LAYOUT

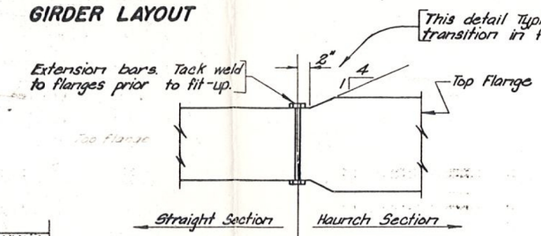
Note: See "Framing Diagram" sheet no. 3 for stiffener and diaphragm spacing.

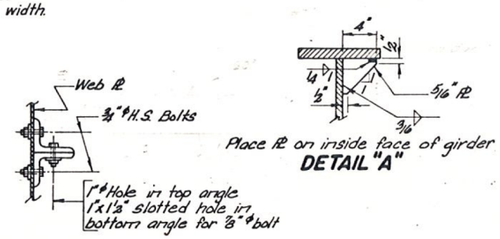
*Grind before radiographing



DETAIL "B"

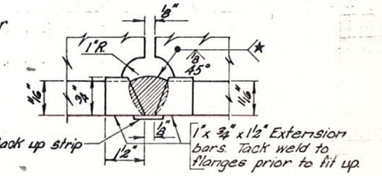
NOTE:- Flange welds shall start and stop on extension bars. The bars shall be of mild steel. After weld is completed extension bars shall be burned off flush.



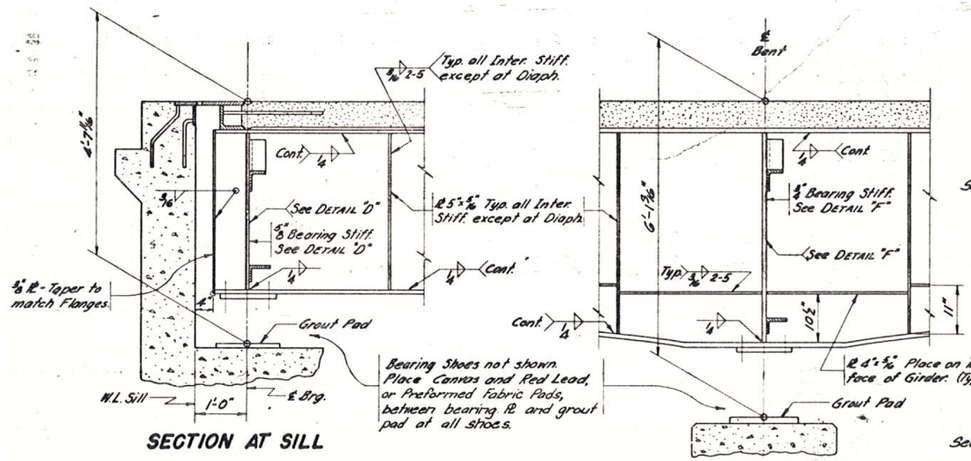


VIEW A-A

DETAIL "A"

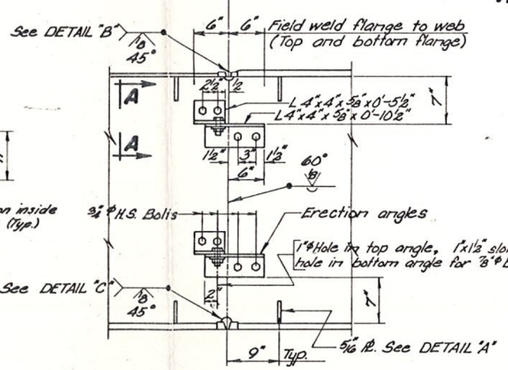


DETAIL "C"

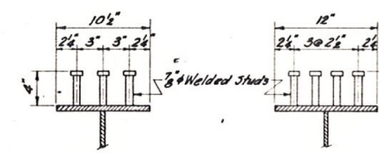


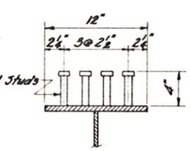
SECTION AT SILL

TYPICAL SECTION AT BENTS

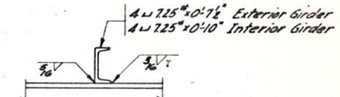


TYPICAL WELDED FIELD SPLICE





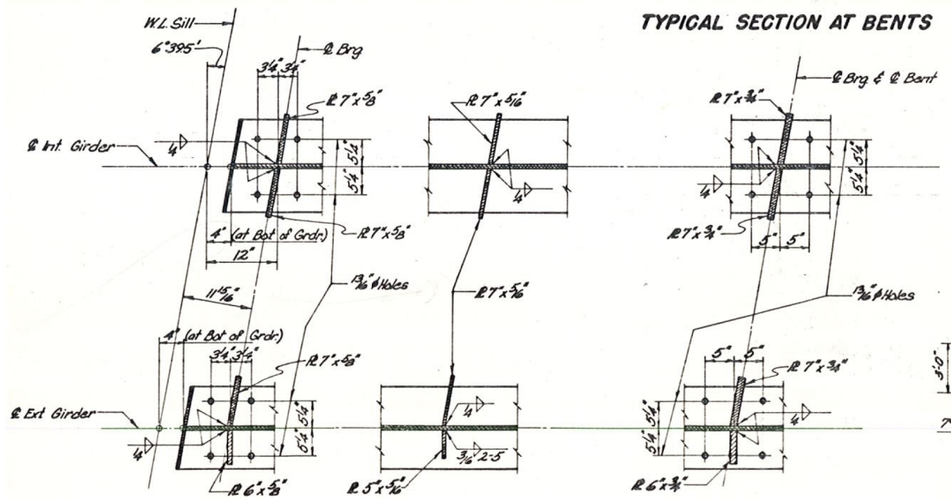
WELDED STUD SHEAR CONNECTOR



CHANNEL SHEAR CONNECTOR

SHEAR CONNECTOR DETAILS

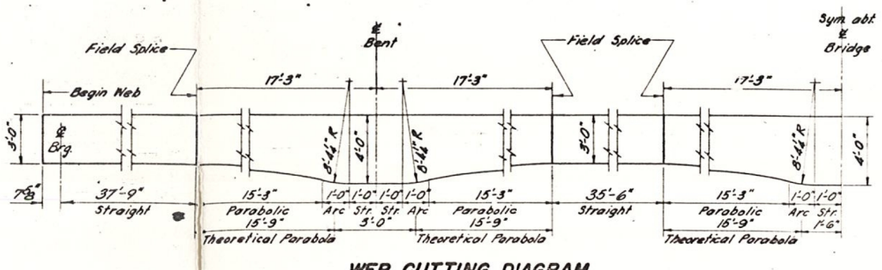
The Contractor may substitute a row of 7/8" ϕ welded studs for each channel shear connector as shown. Channel or welded stud shear connectors are spaced as shown on Girder Layout. Channels shall be placed on the girders facing in the directions as shown on Girder Layout. Shear Connectors will be paid for as Structural Steel based on the weight of channels, regardless of the type of connector used.



DETAIL "D" DETAIL "E" DETAIL "F"

NOTES--

1. Erection angles shown are designed to carry only the shear due to dead load of girders. Erection procedures that will produce moments at the splice points should not be permitted.
2. Angles and bolts are for erection only, and will not be measured for payment.
3. Fill holes in exposed faces of beams with round head bolts.
4. When a transverse stiffener falls within 1'-6" of splice, the triangular plates shown in Detail "A" may be omitted on that side of splice.



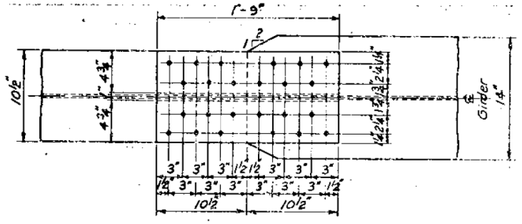
WEB CUTTING DIAGRAM

Revised from 254'-0 3/8" Pennington Co. I 90-2(11)62 - Sta 124+39.00

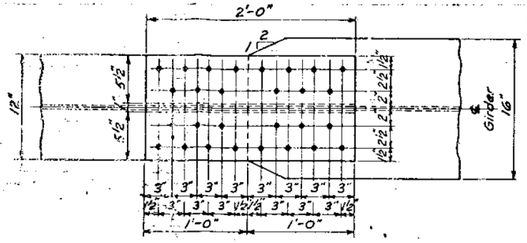
ORIGINAL CONSTRUCTION PLANS

DETAILS OF SUPERSTRUCTURE
FOR
254'-0 1/8" CONT. COMP. GIRDER VIADUCT
30'-0" ROADWAY 6° 39.5' SKEW L.H.F.
OVER I.S. NO. 90 STA. 235+70.30 SEC. 15/14-T103N-R66W
STA. 22+72.99 TO 25+27.01 I 90-7(8)295
AURORA COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
SEPT. 1963
STR. NO. 02-040-149

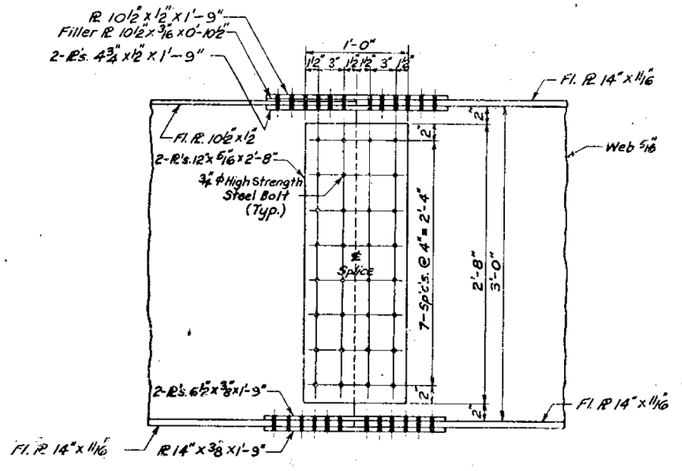
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	20	26



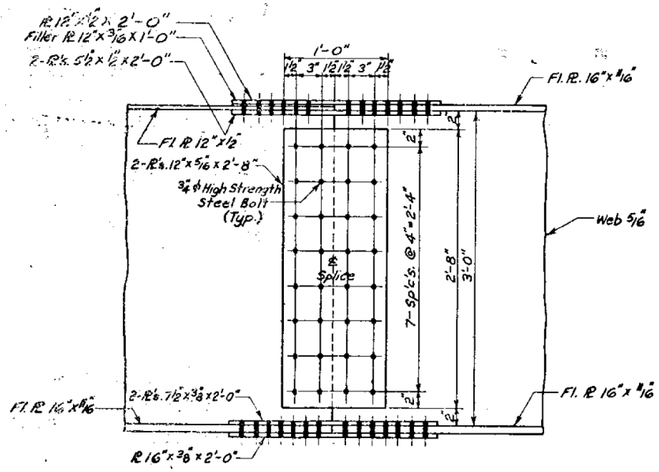
TOP VIEW



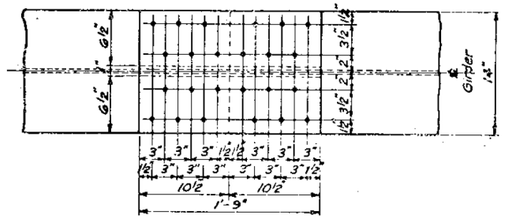
TOP VIEW



ELEVATION OF SPLICE

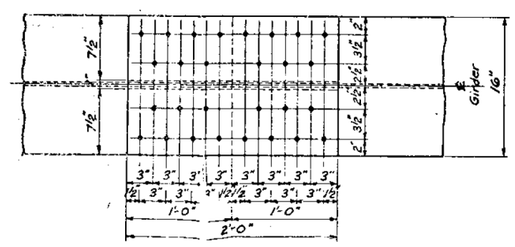


ELEVATION OF SPLICE



BOTTOM VIEW

TYPICAL BOLTED SPLICE
EXTERIOR GIRDER



BOTTOM VIEW

TYPICAL BOLTED SPLICE
INTERIOR GIRDER

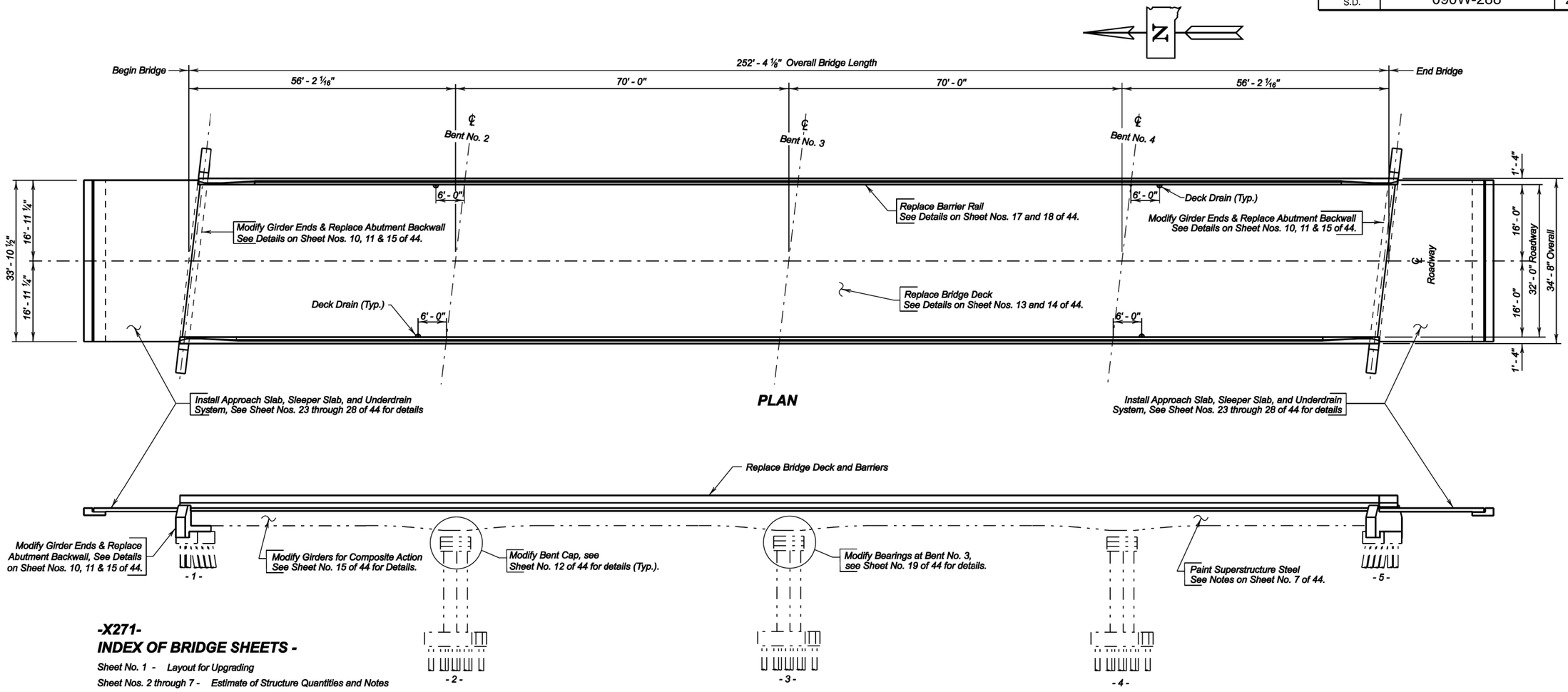
GENERAL NOTES—

1. Use ¾"ϕ High Strength heanyhead bolts (A.S.T.M. A325) with one hardened washer. Hardened washer to be assembled under the turned element.
2. Holes for ¾"ϕ high-strength bolts shall be subpunched and reamed, or drilled and splice plates march-marked after assembling as provided in Section 410.3 of South Dakota Standard Specifications for Roads and Bridges.
3. Steel for splice plates and fill plates shall conform to A.S.T.M. A36 steel.
4. ¾"ϕ high-strength bolts shall be tightened to a minimum tension of 28,400 lbs. Tightening shall be done with properly calibrated wrenches or by the "turn-of-nut" method as provided in Section 410.3 B.16 of South Dakota Standard Specifications for Roads and Bridges.
5. All bolts in flange splices shall be placed with head down.
6. Bolts in web splices of exterior girders shall be placed with heads on exterior face of girders.
7. Triangular plates shown welded to flange and web near girder ends at welded splices shall be omitted when bolted splices are used.
8. Clip ends of intermediate stiffeners, if necessary, to clear flange splice plates.
9. If an intermediate stiffener is located in area of web splice plate, the intermediate stiffener may be shifted to clear.
10. If shear connectors are located in area of flange splice plates, shear connectors may be shifted and re-spaced to clear.
11. Any re-spacing or shifting of intermediate stiffeners and/or shear connectors shall be noted on the shop Plans for approval by the ENGINEER.
12. When the Contractor elects to use the alternate bolted splice, the weight of necessary bolts and plates will not be measured for payment.

ORIGINAL CONSTRUCTION PLANS

DETAILS OF BOLTED FIELD SPLICE
FOR
254'-0⅛" CONT. COMP. GIRDER VIADUCT
30'-0" ROADWAY 6°39.5' SKEW L.H.F.
OVER I.S. NO.90 STA.235+70.30 SEC.15/14-T103N-R66W
STA. 22+72.99 TO 25+27.01 I 90-7(8)295
AURORA COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
SEPT. 1963
STR. NO. 02-040-149

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	21	26



-X271-

INDEX OF BRIDGE SHEETS -

ORIGINAL CONSTRUCTION PLANS

LAYOUT FOR UPGRADING
FOR

252' - 4 1/8" CONT. COMP. GIRDER BRIDGE

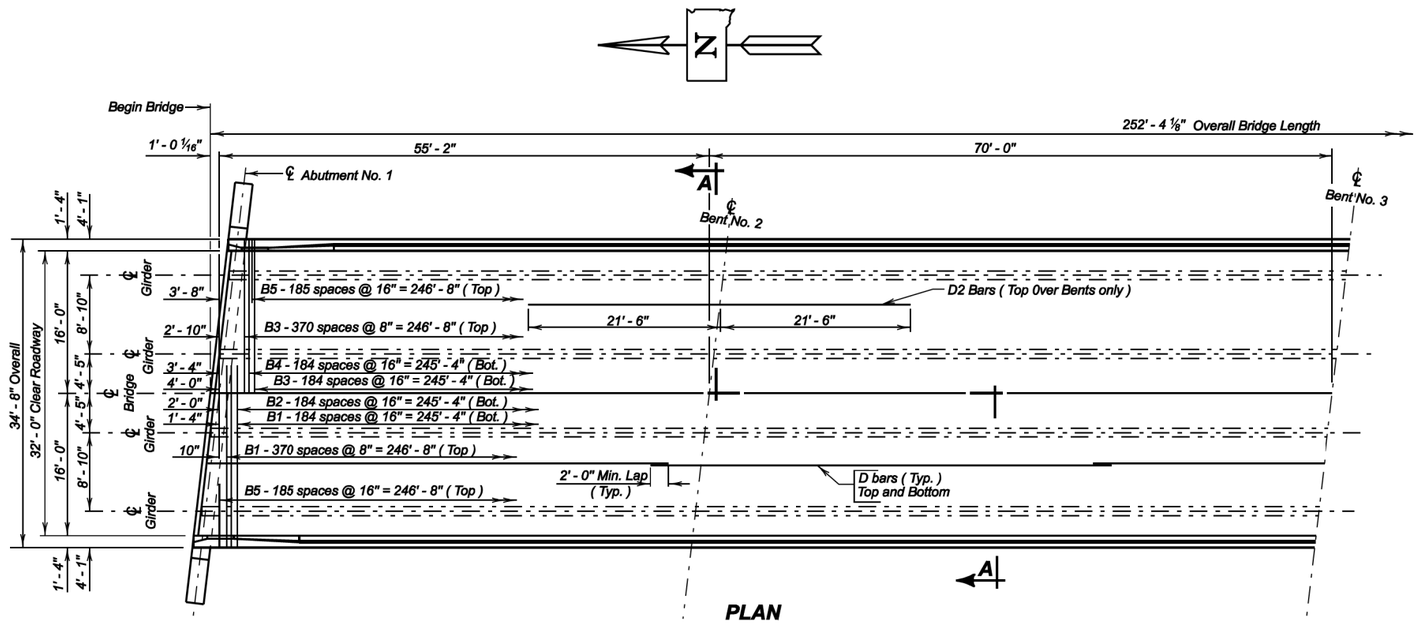
32'-0" ROADWAY
OVER I. S. 90
STR. NO. 02-040-149
PCN 000L

6°39.5' SKEW L.H.F
SEC. 15/14-T103N-R66W
IM 0907(70)296

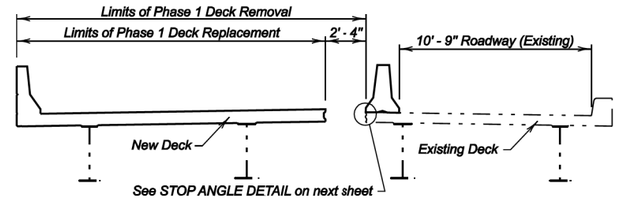
AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2009
STR. NO. 02-040-149

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	22	26

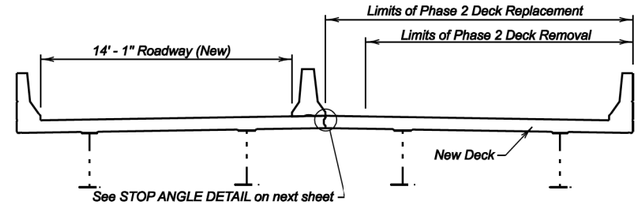


PLAN



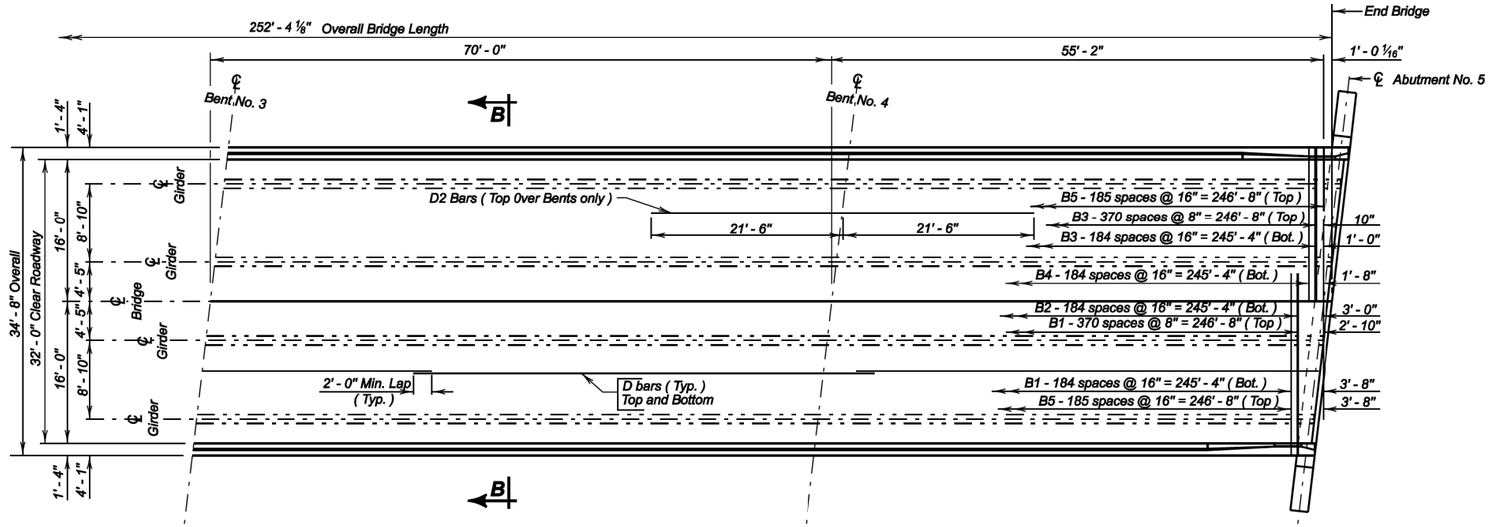
△ SEC. B - B PHASE 1 CONSTRUCTION

Phase 1 - Place movable concrete barrier on the existing bridge deck at the Phase 1 bridge deck removal limits. Divert traffic to a single lane east of roadway centerline and proceed with Phase 1 bridge deck removal and deck replacement.



△ SEC. B - B PHASE 2 CONSTRUCTION

Phase 2 - Relocate movable concrete barrier to the inside edge of the Phase 1 bridge deck. Divert traffic to a single lane on the new bridge deck and proceed with Phase 2 bridge deck removal and deck replacement.



PLAN

ORIGINAL CONSTRUCTION PLANS

SLAB REPLACEMENT DETAILS

FOR

252' - 4 1/8" CONT. COMP. GIRDER BRIDGE

32'-0" ROADWAY — **6°39.5' SKEW L.H.F.**

OVER I. S. 90 — **SEC. 15/14-T103N-R66W**

STR. NO. 02-040-149 — **IM 0907(70)296**

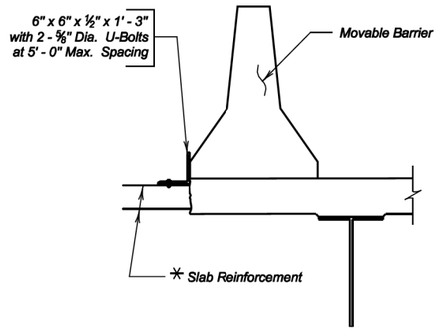
AURORA COUNTY

S. D. DEPT. OF TRANSPORTATION

JULY 2009

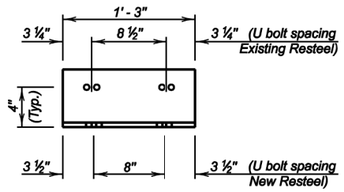
STR. NO. 02-040-149

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	23	26

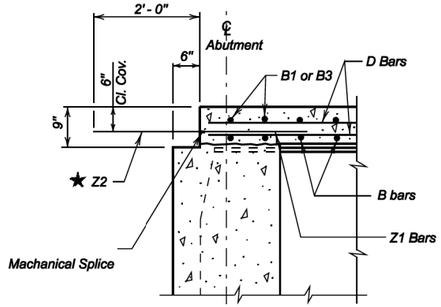


△ STOP ANGLE DETAIL

✳ The Contractor shall take appropriate measures to protect the new epoxy coated reinforcing steel that the Stop Angles attach to during Phase 2 Reconstruction. Any epoxy coating that becomes damaged during construction shall be repaired by the Contractor at no cost to the State.



NOTE:
Angles (50) and Bolts (100) shall be included in the Unit Price Bid for Class A45 Concrete, Bridge Deck.



TYPICAL SECTION AT ABUTMENTS

★ Z2 Bars are listed and included in Approach Slab quantities. See Sheet No. 27 of 44.

ESTIMATED QUANTITIES

	ITEM	UNIT	Phase 1 QUANTITY	Phase 2 QUANTITY
	Class A45 Concrete, Bridge Deck	Cu. Yd.	133.3	133.3
	Epoxy Coated Reinforcing Steel	Lb.	39724	37962
	Removal of Concrete Bridge Slab	Sq. Yd.	522.1	350.4
✳	Bridge Repainting	L.S.	Lump Sum	Lump Sum
	Modify Girder Ends	Each	4	4
	Stud Shear Connector	Each	114	114
ϕ	Deck Drains (Girder Bridge)	Each	2	2
	Breakout Structural Concrete	Cu. Yd.	2.0	2.0
	No. 7 Rebar Splice	Each	42	42

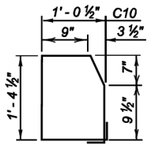
ϕ See Sheet No. 1 of 44 for location of Deck Drains.

✳ For informational purposes only, the estimated area to be painted is 11,800 sq. ft.

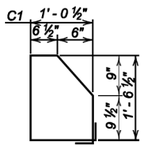
REINFORCING SCHEDULE

Phase 1 Mk.	No.	Size	Length	Type
B1	556	6	19' - 5"	Str.
B2	185	5	19' - 5"	Str.
B5	186	5	7' - 0"	Str.
B15	6	5	14' - 6"	Str.
B16	5	4	51' - 6"	Str.
B17	4	4	8' - 6"	19B
B18	6	8	4' - 3"	19B
B19	6	5	2' - 4"	Str.
B20	6	6	3' - 2"	17A
C1	244	5	5' - 10"	T2A
C2	230	5	5' - 1"	S11
C3	2	5	6' - 4"	T1
C4	2	5	6' - 5"	T1
C5	2	5	5' - 7"	T1
C6	2	5	6' - 8"	T1
C7	2	5	6' - 9"	T1
C8	2	5	6' - 11"	T1
C9	2	5	7' - 0"	T1
C10	8	6	6' - 0"	T1A
C11	8	5	7' - 1"	T1
C12	2	6	4' - 9"	17
C13	2	5	5' - 3"	17
D1	190	5	51' - 10"	Str.
D2	48	6	43' - 0"	Str.
D3	30	5	48' - 6"	Str.
Z1	42	7	2' - 0"	Str.

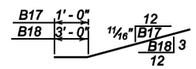
Bending Details



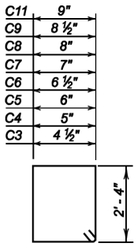
Type T1A



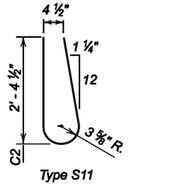
Type T2A



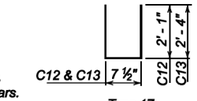
Type 19B



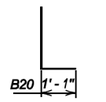
Type T1



Type S11



Type 17

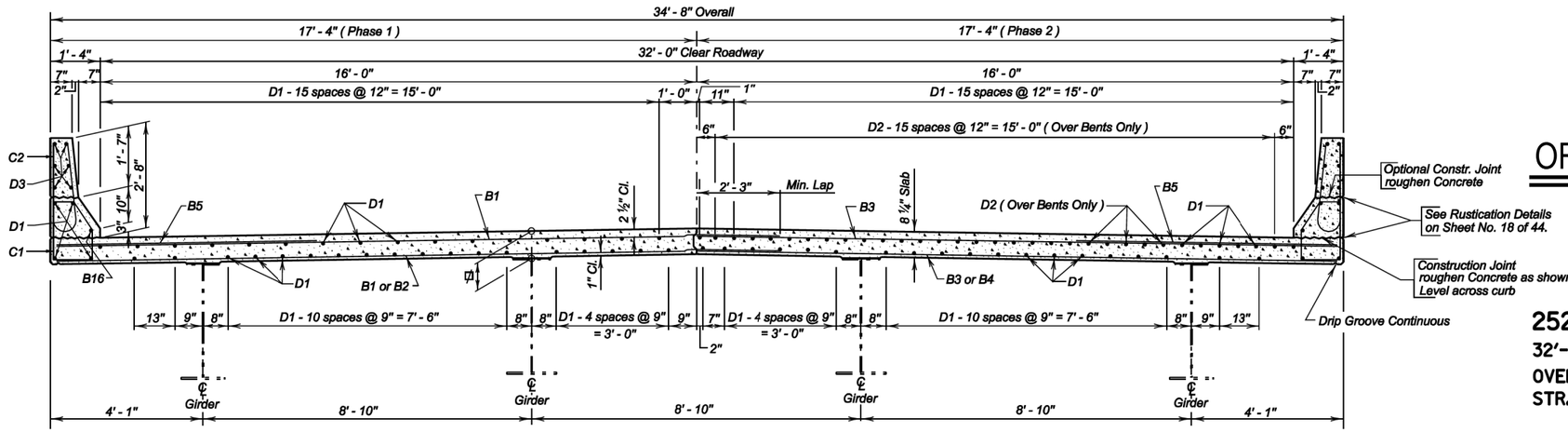


Type 17A

Phase 2 Mk.	No.	Size	Length	Type
B3	556	6	17' - 2"	Str.
B4	185	5	17' - 2"	Str.
B5	186	5	7' - 0"	Str.
B15	6	5	14' - 6"	Str.
B16	5	4	51' - 6"	Str.
B17	4	4	8' - 6"	19B
B18	6	8	4' - 3"	19B
B19	6	5	2' - 4"	Str.
B20	6	6	3' - 2"	17A
C1	244	5	5' - 10"	T2A
C2	230	5	5' - 1"	S11
C3	2	5	6' - 4"	T1
C4	2	5	6' - 5"	T1
C5	2	5	5' - 7"	T1
C6	2	5	6' - 8"	T1
C7	2	5	6' - 9"	T1
C8	2	5	6' - 11"	T1
C9	2	5	7' - 0"	T1
C10	8	6	6' - 0"	T1A
C11	8	5	7' - 1"	T1
C12	2	6	4' - 9"	17
C13	2	5	5' - 3"	17
D1	200	5	51' - 10"	Str.
D2	48	6	43' - 0"	Str.
D3	30	5	48' - 6"	Str.
△ Z1	42	7	2' - 0"	Str.

NOTES- All dimensions are out to out of bars.
△ See Sheet No. 26 of 44 for location of Z1 Bars.
All reinforcing steel shall be epoxy coated.

NOTE: All Barrier Curb Details Shown on Sheet Nos. 17 & 18 of 44.



SECTION A - A

(See Sheet No. 13 of 44)

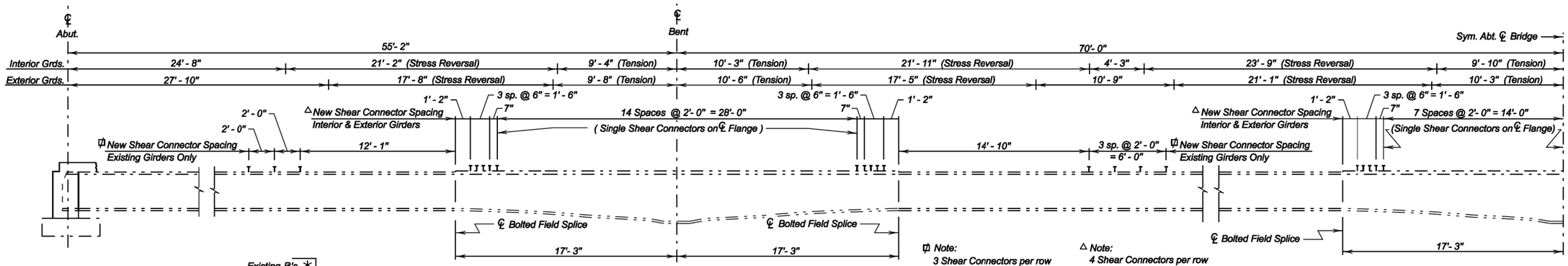
ϕ Dimension are at ℄ girders: this dimension at points along the girders shall be computed as shown on the Table of Slab Form Elevations Sheet No. 16 of 44.

ORIGINAL CONSTRUCTION PLANS

SLAB REPLACEMENT DETAILS (CONT.)
FOR
252' - 4⅛" CONT. COMP. GIRDER BRIDGE
32'-0" ROADWAY
OVER I. S. 90
STR. NO. 02-040-149
6°39.5' SKEW L.H.F.
SEC. 15/14-T103N-R66W
IM 0907(70)296

AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2009
STR. NO. 02-040-149

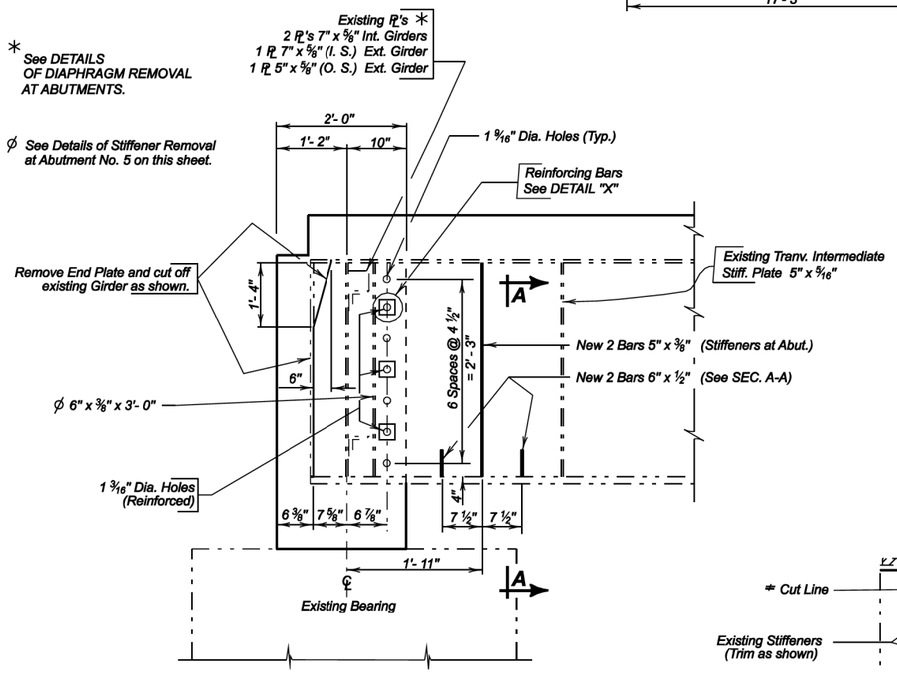
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	24	26



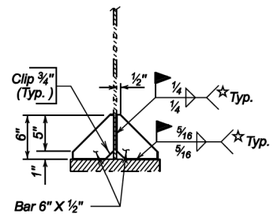
GIRDER LAYOUT

ϕ Note:
3 Shear Connectors per row unless otherwise noted.

△ Note:
4 Shear Connectors per row unless otherwise noted.

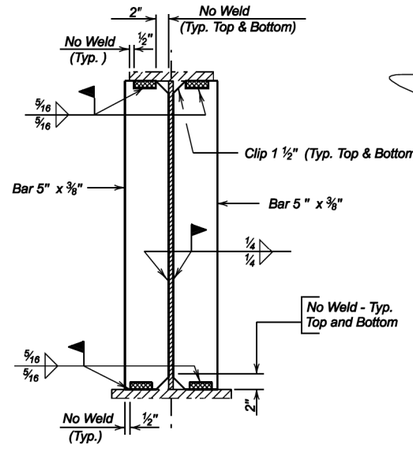


TYPICAL SECTION AT ABUTMENTS



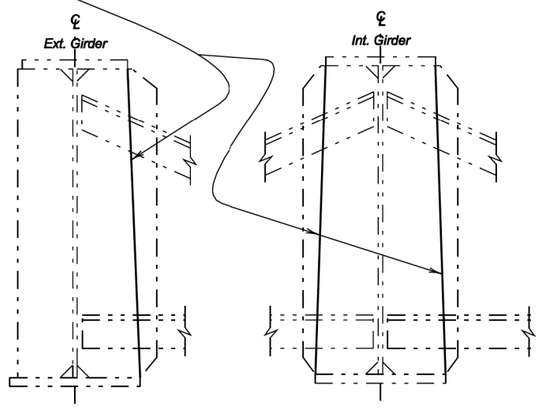
SEC. A-A

☆ NOTE: All fillet welds shall terminate ½" from edge of ½" Bar (Typ.)

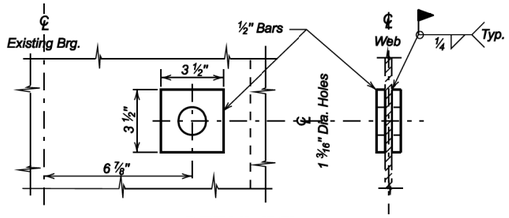


DETAILS OF NEW STIFFENERS AT ABUTMENTS

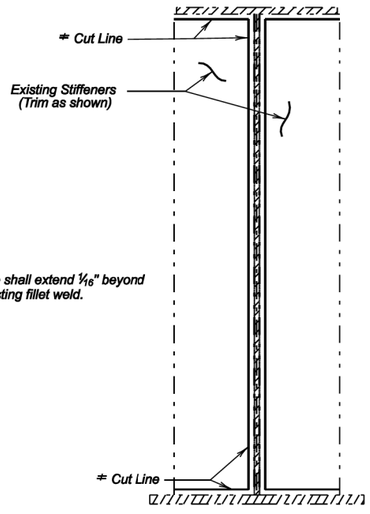
Cut Existing Diaphragm Angles and Stiffeners along a straight line between the edge of the top flange and the edge of the bottom flange as shown. Care shall be taken not to damage the existing flanges.



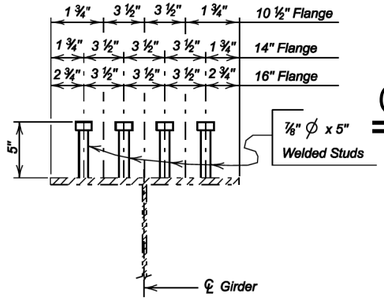
DETAILS OF DIAPHRAGM REMOVAL AT ABUTMENTS



DETAIL "X"



DETAILS OF STIFFENER REMOVAL AT ABUTMENT NO. 5



SHEAR CONNECTOR DETAILS

Welded Stud Shear Connectors are to be spaced as shown on Girder Layout. Quantity for Shear Connectors to be added is shown on Sheet No. 5 of 24. Use this Detail to replace Shear Connectors which need to be replaced due to damage from breakout of slab concrete as approved by the ENGINEER.

ORIGINAL CONSTRUCTION PLANS

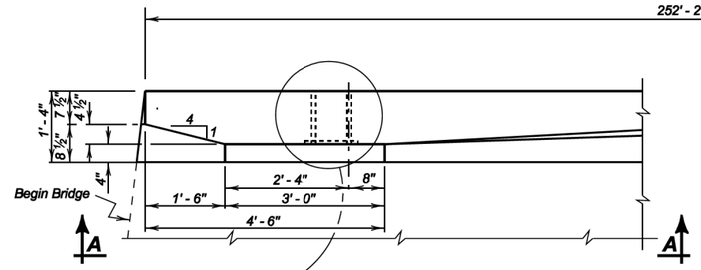
GIRDER LAYOUT & MODIFICATION DETAILS
FOR
252' - 4⅛" CONT. COMP. GIRDER BRIDGE

32'-0" ROADWAY
OVER I. S. 90
STR. NO. 02-040-149

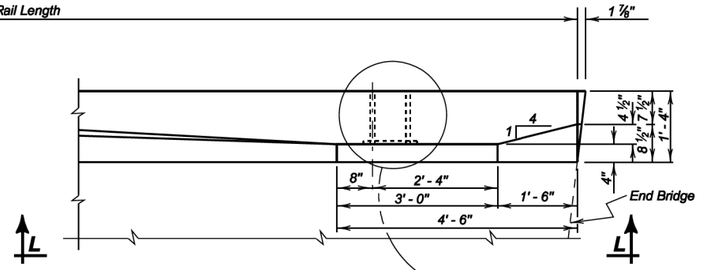
6°39.5' SKEW L.H.F.
SEC. 15/14-T103N-R66W
IM 0907(70)296

AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2009
STR. NO. 02-040-149

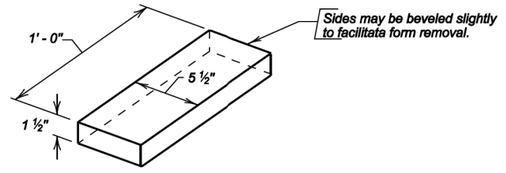
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	25	26



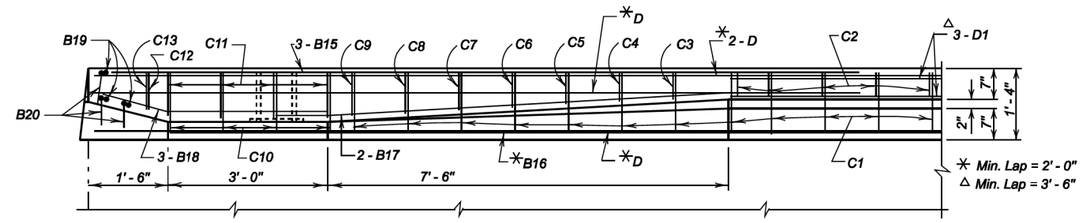
VIEW A - A



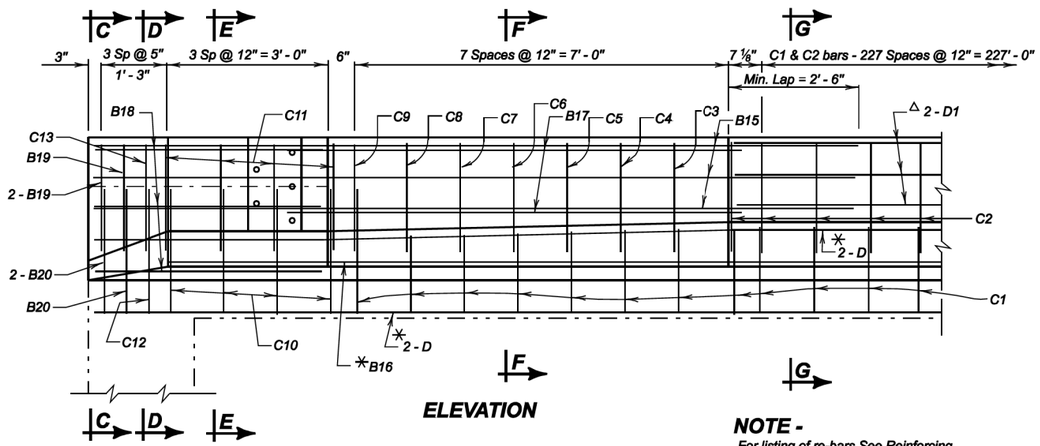
VIEW L - L



RECESS DETAIL

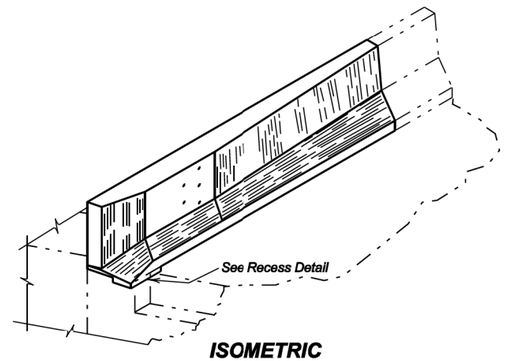


PLAN



ELEVATION

NOTE -
For listing of re-bars See Reinforcing Schedule Sheet No. 14 of 44.



ISOMETRIC VIEW

ORIGINAL CONSTRUCTION PLANS

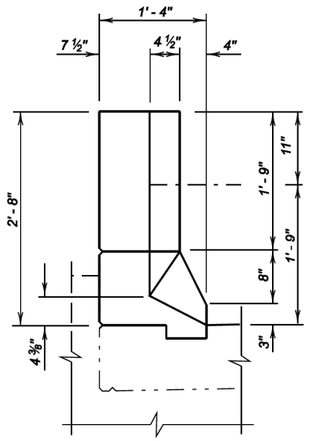
END BLOCK, BARRIER CURB AND DRAIN DETAILS
FOR
252' - 4⅛" CONT. COMP. GIRDER BRIDGE

32'-0" ROADWAY
OVER I. S. 90
STR. NO. 02-040-149

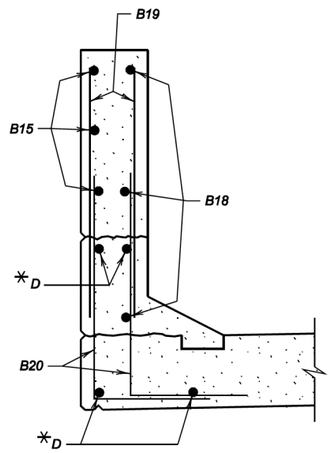
6°39.5' SKEW L.H.F.
SEC. 15/14-T103N-R66W
IM 0907(70)296

AURORA COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2009
STR. NO. 02-040-149

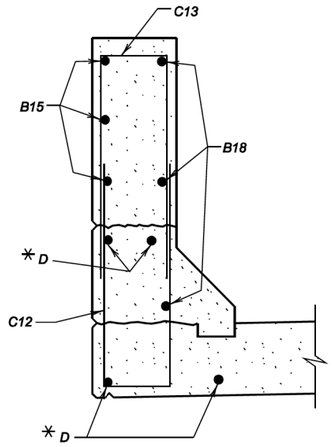
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-288	26	26



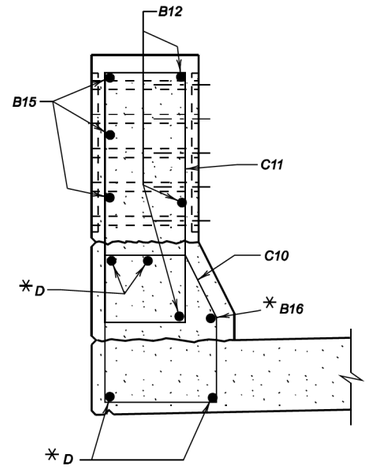
VIEW B - B



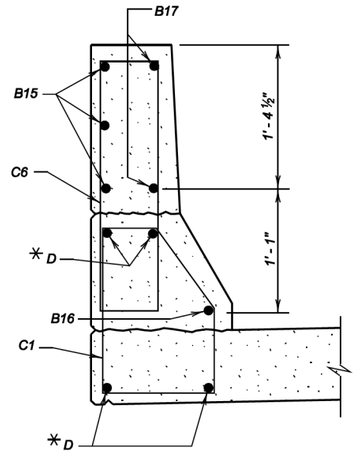
SECTION C - C



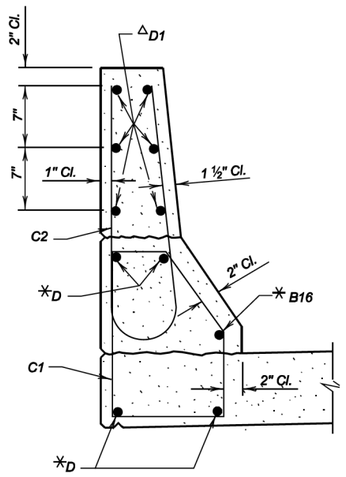
SECTION D - D



SECTION E - E

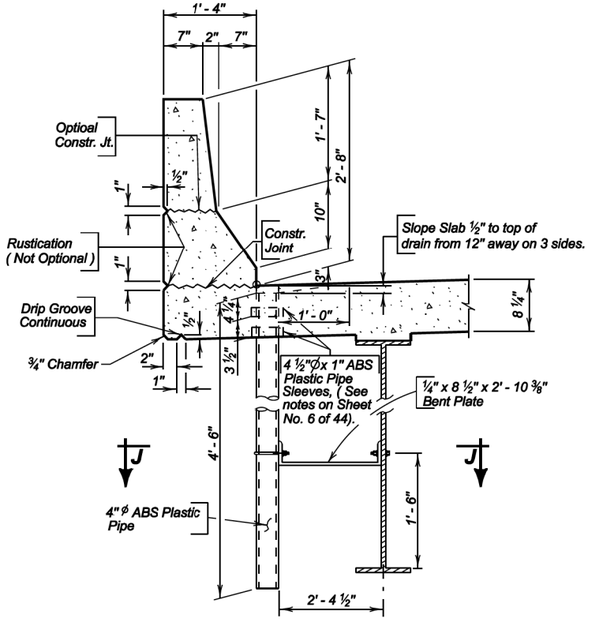


SECTION F - F



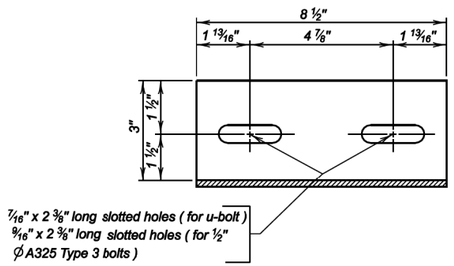
SECTION G - G

✳ min lap = 2' - 0"

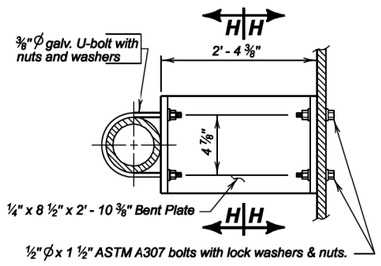


DRAIN AND BARRIER DETAILS

(Reinforcing Steel not shown for clarity)



SECTION H - H



SECTION J - J

NOTE : The connection between the drop tube and web of girder shall be made prior to the placing of the deck slab. See Sheet No. 1 of 44 for spacing of deck drains and 6 of 44 for notes regarding Deck Drains.

ORIGINAL CONSTRUCTION PLANS

END BLOCK, BARRIER CURB AND DRAIN DETAILS (CONT.) FOR

252' - 4⅛" CONT. COMP. GIRDER BRIDGE

32'-0" ROADWAY
OVER I. S. 90
STR. NO. 02-040-149

6°39.5' SKEW L.H.F.
SEC. 15/14-T103N-R66W
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